

SARASVATI

R.gveda

Volume 2



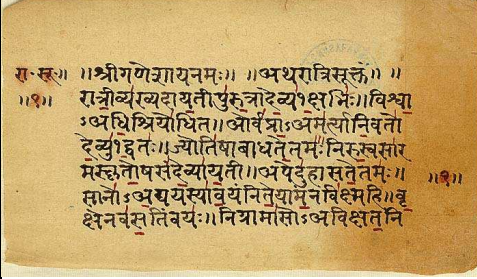
Gold bead; Early Dynastic necklace from the Royal Cemetery; now in the Leeds collection

स त्रितस्याधि सानवि पवमानो अरोचयत् ।

जामिभिः सूर्य सह ॥

9.037.04 The pure Soma upon the high place (of the sacrifice) of Trita, attended by its kindred rays, has lighted up the Sun.

bharatiyo = a caster of metals; a brazier; bharatar, bharatal, bharatal. = moulded; an article made in a mould; bharata = casting metals in moulds; bharavum = to fill in; to put in; to pour into (G.lex.) **bhart** = a mixed metal of copper and lead; bhart-i_ya_ = a barzier, worker in metal; bhat., bhra_s.t.ra = oven, furnace



R.gveda Manuscript RV 10.127
ra_trisu_kta (University of
Pennsylvania)

10.127.01 The divine Night approaching looked upon many places with her eyes, she has assumed all beauties. [This su_kta is recited at the sacrifice offered in the early morning by one who has had unplesant dreams

during the night].

Dr. S. Kalyanaraman

Babasaheb (Umakanta Keshav) Apte Smarak Samiti

Bangalore 2003

SARASVATI: R.gveda by S. Kalyanaraman

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About the Author



Dr. S. Kalyanaraman has a Ph.D. in Public Administration from the University of the Philippines; his graduate degree from Annamalai University was in Statistics and Economics. His PhD dissertation was on development administration, a comparative study of 6 Asian countries, published as *Public Administration in Asia* in 2 volumes.

He was a Senior Executive in the Asian Development Bank, Manila, Philippines for 18 years from 1978 to 1995 responsible for the world-wide IT network of the Bank and disbursements on a portfolio of US\$60 million for over 600 projects in 29 developing countries of Asia-Pacific region. Prior to joining the Bank, he was Financial Advisor on the Indian Railways (responsible, as part of a professional team, for introducing computers on the Railways) and Chief Controller of Accounts, Karnataka Electricity Board. He took voluntary retirement from the Bank five years' ahead of schedule and returned to Bharat to devote himself to Sarasvati River researches and development projects.

He is well-versed in many languages of Bharat: Tamil, Telugu, Kannada, Hindi, Sanskrit. He has compiled a comparative dictionary for 25 ancient Indian languages, titled *Indian Lexicon*. He has set up a website on Sarasvati River and Civilization with over 30,000 files (<http://www.hindunet.org/saraswati>); he is the founder of the yahoogroup, IndianCivilization, which has over 800 members (April 2003). His work, *Sarasvati*, was published in 2001 a compendium on the discovery of Vedic River Sarasvati. The present 7-volume encyclopaedic work on *Sarasvati Civilization* is a result of over 20 years of study and research. He is Director, Sarasvati Nadi Shodh Prakalp, Akhil Bharatiya Itihaasa Sankalana Yojana, Chennai 600015. The Prakalp is engaged in researches related to Sarasvati Civilization and interlinking of national rivers of Bharat. He has contributed to many scholarly journals and participated in and made presentations in a number of national and international conferences including the World Sanskrit Conference held in Bangalore in 1995. He delivered the Keynote address in the International Conference of World Association of Vedic Studies, 3rd Conference held in University of Massachusetts, Dartmouth, in July 2002. kalyan97@yahoo.com

Diacritical marks used

The Kyoto-Harvard convention is NOT used since the intermingling of English words with Indian language words will distort the representation of capital letters and is not easy to read.

The standard diacritical marks are deployed but, instead of ligaturing them on top and bottom of the alphabet, the diacritical marks FOLLOW immediately after the vowel or consonant which is modified. For e.g., a_ connotes 'long a', n. connotes retroflex N. After the UNICODE is standardized, the next edition will display the modified codes for ease of representation on web pages on the internet.

a rut,at	e bet	d then
a_/ law	e_ ate	d. dot
a~_ long	e~_ bane	l. rivalry
/a~ un-	/e~ when, whey	n. and
i it	o obese	n- new
i_ bee	o_ note	r- curl
i~_ been	o~_ bone,one	r. rug
/i~ in	m. mum	r.. (zsh)
u you	n: king	s fuse
u_/ ooze	n~ nyet	s. shut
u~_ boon	h-/k- what	s' sugar
/u~ june	c change	t both
...	c. so	t. too

List of languages and abbreviations

The languages of the linguistic area and the abbreviations used are as follows:

A. Assamese
Ap. Apabhram.s'a
Ash. Ashkun (As.ku~--Kafiri)
Aw. Awadhi_
B. Bengali (Ban: gla_)
Bal. Balu_ci_ (Iranian)
Bashg. Bashgali_ (Kafiri)
BCE Before Common Era (BC)
Bel. Belari
Bhoj. Bhojpuri_
Bi. Biha_ri_
Br. Bra_hui_
Brj. Brajbha_s.a_
Bshk. Bashkari_k (Dardic)
Bur. Burushaski
CE Common Era (AD)
Chil. Chili_s (Dardic)
D.. D.uma_ki
Dm. Dame~d.i_ (Kafiri-Dardic)
G. Gujara_ti_
Ga. Gadba
Garh. Gar.hwa_li_
Gau. Gauro (Dardic)
Gaw. Gawar-Bati (Dardic)
Gmb. Gambi_ri_ (Kafiri)
Go. Gondi
Gy. Gypsy or Romani
H. Hindi_
Ir. Irul.a
K. Ka_s'mi_ri_
Ka. Kannad.a
Kaf. Kafiri
Kal. Kalasha (Dardic)
Kand. Kandia (Dardic)
Kat.. Kat.a_rqala_ (Dardic)
Kho. Khowa_r (Dardic)
Khot. Khotanese (Iranian)
Kmd. Ka_mdeshi (Kafiri)
Ko. Kota
Kod.. Kod.agu (Coorg)
Koh. Kohista_ni_ (Dardic)
Kol. Kolami
Kon. Kon:kan.i_
Kond.a
Kor. Koraga
Kt. Kati or Katei (Kafiri)
Ku. Kumauni_
Kui

Kurub. Bet.t.a Kuruba
Kur. Kur.ux (Oraon, Kurukh)
Kuwi
L. Lahnda_
M. Mara_t.hi_
Ma. Malayalam
Mai. Maiya~_ (Dardic)
Malt. Malto
Ma_lw. Ma_lwa_i_
Mand.. Mand.a
Marw. Ma_rwa_r.i_
Md. Maldivian dialect of Sinhalese
MIA Middle Indo-Aryan
Mj. Munji_ (Iranian)
Mth. Maithili_
Mu. Mun.d.a_ri (Munda)
N. Nepa_li
Nahali
Nin.g. Nin:gala_mi (Dardic)
Nk. Naikr.i (dialect of Kolami = LSI, Bhili of Basim; Naiki of Chanda)
OIA Old Indo-Aryan
Or. Or.iya_
P. Punja_bi_ (Paja_bi_)
Pa. Parji
Pali
Pah. Paha_r.i_
Pa_Ku. Pa_lu Kur-umba
Pas'. Pas'ai (Dardic)
Pe. Pengo
Phal. Phalu_r.a (Dardic)
Pkt. Prakrit
S. Sindhi_
Sant. Santa_li_ (Mun.d.a_)
Sh. Shina (S.in.a_.Dardic)
Si. Sinhalese
Sik. Sikalga_ri_ (Mixed Gypsy Language: LSI xi 167)
Skt. Sanskrit
Sv. Savi (Dardic)
Ta. Tamil
Te. Telugu
Tir. Tira_hi_ (Dardic)
To. Toda
Tor. To_rwa_li_ (Dardic)
Tu. Tulu
U. Urdu
Werch. Werchikwa_r or Wershikwa_r (Yasin dialect of Burushaski)
Wg. Waigali_ or Wai-ala_ (Kafiri)
Wkh. Wakhi (Iranian)
Wot.. Wot.apu_ri_ (language of Wot.apu_r and Kat.a_rqala_. Dardic)
WPah. West Paha_r.i

Abbreviations used for linguistic categories and other languages

Languages, Epigraphs	
As'. As'okan inscriptions	etym. etymology
Austro-as. Austro-asiatic (cf. Munda)	expr.expression
BHskt. Buddhist Hybrid Sanskrit	f./fem. feminine
(Franklin Edgerton, <u>Buddhist Hybrid Sanskrit Grammar and Dictionary</u> , Newhaven, 1953)	fig. figuratively
Dard. Dardic	fr. from
Dhp. Ga_ndha_ri or Northwest Prakrit (as recorded in the Dharmapada ed. J. Brough, Oxford 1962)	fut. future
Drav. Dravidian	gen. genitive
IA. Indo-aryan	hon. honorific
IE. Indo-european	id. idem (having the same meaning)
Ind. Indo-aryan of India proper excluding Kafiri and Dardic (as classified by R.L. Turner)	imper.imperative
KharI. Kharos.t.hi_ inscriptions; Middle Indo-aryan forms occurring in <u>Corpus Inscriptionum Indicarum</u> Vol. II Pt.I, Calcutta, 1929 MIA Middle Indo-aryan	incl. including
NiDoc. Language of 'Kharos.t.hi_ Inscriptions discovered by Sir Aurel Stein in Chinese Turkestan' edited by A.M. Boyer, E.J. Rapson, and E. Senart	inf.infinitive
Ar.Arabic	inj.injunctive
Aram.Aramaic	inscr.inscription
Arm.Armenian	lex. lexicographical works or Kos'as
Av. Avestan (Iranian)	lit. literature
E. English	loc. locative
Gk. Greek	m. masculine
Goth. Gothic	M Middle
Ishk. Ishka_shmi_ (Iranian)	metath. metathesis (of)
Kurd. Kurdish (Iranian)	N North
Lat. Latin	Na_ Na_ci Na_t.u usage
Lith.Lithuanian	Naut. Nautical
OHG. Old High German	nom.nominative
Orm. O_rmur.i_ (Iranian)	nom.prop. nomen proprium (proper name)
OSlav. Old Slavonic	num.numeral(s)
Par. Para_ci_ (Iranian)	NWNorth-west
	O Old
	obl. oblique case
	onom.onomatopoeic
	p. page
	part. participle
	pass. passive
	perf. perfect
	perh. perhaps
	phonet.phonetically
	pl. plural
	pp. past participle (passive)
	pres. present
	pron. pronoun
	Pudu. Pudukkottai usage

Pahl. Pahlavi (Iranian) Pers. Persian (Iranian) Port. Portuguese Pr. Prasun (Kafiri) Psht. Pashto (Iranian) Tib. Tibetan Toch. Tocharian Turk. Turkish Yid. Yidgha (Iranian) Abbreviations : Grammatical * hypothetical < (is) derived from > (has) become ? doubtful Xinfluenced by + extended by ~ parallel with acc. accusative adj. adjective adv. adverb aor. aorist caus. causative cent. century cf. confer (compare) cmpd. compound(ed) com. commentary, t.i_ka_ conj. conjunction dat. dative dist. fr. distinct from du. dual E East e.g. example	redup. reduplicated ref. reference(s) S South sb./subst. substantive semant. semantically st. stem subj. subjunctive syn. synonym Tinn. Tinnevelly usage Tj. Tanjore usage usu. usual(ly) vais.n..vais.n.ava usage vb. verb viz. videlicet (namely) W West
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Foreword

I had written a foreword for Dr. Kalyanaraman's work titled *Sarasvati* in 2000. As promised, he has now followed up this work with an additional five volumes to complete the encyclopaedia on Sarasvati – the river, goddess and civilization of Bha_rata.

It is a privilege indeed to receive the seven volumes titled:

1. *Sarasvati: Civilization*
2. *Sarasvati: R.gveda*
3. *Sarasvati: River*
4. *Sarasvati: Bharati*
5. *Sarasvati: Technology*
6. *Sarasvati: Language*

Sarasvati: Epigraphs

This septet constitutes a fitting homage to Babasaheb (Uma_ka_nt kes'av) Apte, particularly in the wake of the centenary celebrations planned for 2003 in memory of this patriot who wanted a presentation of the history of Bha_rata from a Bha_rati_ya socio-cultural perspective.

The dream of the late Padmashri Vakankar, archaeologist is also partly fulfilled with the delineation of the peoples' lives over 5,000 years on the banks of the Rivers Sarasvati and Sindhu.

The Sarasvati Nadi Shodh Prakalp which is headed by Dr. Kalyanaraman under the guidance of Shri Haribhau Vaze, All-India Organizing Secretary, Akhila Bharateeya Itihaasa Sankalana Yojana should be complimented for bringing to successful completion this important phase of writing of the history of ancient Bha_rata.

The River Sarasvati has not only been established as ground-truth (bhu_mi satyam), but the vibrant civilization which was nurtured on the banks of this river has been exquisitely unraveled in the five volumes, covering virtually all aspects of the lives of the pitr.-s, many of whose a_s'rama-s are venerated even today in many parts of Bha_rata.

The five volumes provide a framework for understanding the writing system evolved ca. 5,300 years ago to record the possessions and items traded by metal- and fire-workers, the bharata-s. The language spoken by the people is also becoming clearer, with the existence of a linguistic area on the banks of the two rivers – the substrata and ad-strata lexemes which seem to match the glyphs of inscribed objects are a testimony to this discovery. This calls for a paradigm shift in the study of languages of Bha_rata with particular reference to the

essential semantic unity of all the language families, thanks to intense socio-economic and cultural interactions across the length and breadth of Bha_rata.

Hopefully, this work should generate many more research studies of this kind to further study the impact of the civilization on the cultural unity of the nation.

It is also heartening to note that work has started to revive the Rivr Sarasvati and to interlink the rivers of the country. This will be a garland presented by the children of the country to Bha_rata Ma_ta_ setting up a network of about 40,000 kms. Of National Waterways which will complement the Railways system to further strengthen the infrastructure facilities and to provide a fillip to development projects in all sectors of the economy.

I understand that Kalyanaraman is now embarking on a project to write the history of Dharma. I wish him all success in his endeavours.

M.N. Pingley

Kaliyugabda 5105. a_s.a_d.ha, Gurupurnima. July 13, 2003 CE.

Publisher's Note

On behalf of Baba Saheb (Umakanta Keshav) Apte Smarak Samiti, it gives me great pleasure to publish the set of seven volumes of the encyclopaedic work of Dr. S. Kalyanaraman with over 4,000 illustrations and impressive documentation.

7. *Sarasvati: Civilization*
8. *Sarasvati: R.gveda*
9. *Sarasvati: River*
10. *Sarasvati: Bharati*
11. *Sarasvati: Technology*
12. *Sarasvati: Language*

Sarasvati: Epigraphs

This is a follow-up of the first work titled *Sarasvati* published in 2000 which focused on the River Sarasvati. These five additional volumes focus on the language, writing system, technology – archaeo-metallurgy, in particular, the lives of the people who lived between 3500 to 5300 years ago and the importance of this legacy and heritage on the history of Bha_rata.

This compendium has been made possible by the contributions made by scientists and scholars of the country from a variety of disciplines, ranging from geology and glaciology to atomic research and language studies.

This comprehensive work on Sarasvati thus constitutes a golden chapter in the work of the Akhila Bharateeya Itihaasa Sankalana Yojana, providing the foundation for future works on subsequent periods of the history of the nation.

A principal objective of the Baba Saheb (Umakanta Keshav) Apte Smarak Samiti is the authenticated study of the history of our nation. For this purpose the Akhila Bharatiya Itihaasa Sankalana Yojana affiliated with the Samiti, has been working with a number of scholars and institutions organizing seminars and conferences and bringing out publications. The Samiti is a non-profit, voluntary organization and is entirely supported by volunteers and philanthropists. I wish to thank all the well-wishers and contributors to the Samiti's work. In particular, I would like to acknowledge with gratitude the contribution made by Shri G. Pulla Reddy, Shri Ramadas Kamath, and Basudeo Ramsisaria Charitable Trust, ICICI, Government of Goa, in enabling this publication. Sincere thanks are due to K. Joshi and Co., and Dr. C.N. Parchure who have undertaken the supervision of the publication.

Plans have been initiated to start a national center to study the history of vanava_si people, to produce an encyclopaedia on the Hindu World and to organize research centers in all states of the country, to publish a series of research volumes on various aspects of the Bharatiya itiha_sa in all languages of Bharat, using multimedia presentations.

Haribhau Vaze

National Organizing Secretary, Akhil Bharatiya Itihaasa Sankalana Yojana and Trustee, Baba Saheb (Umakanta Keshav) Apte Smarak Samiti, Bangalore.

Kaliyugabda 5105. a_s_a_d.ha, Gurupurnima. July 13, 2003 CE

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Author's Preface

At the outset, I offer my sincere thanks to Moropant Pingley and Haribhau Vaze for their encouragement and support in pursuing this endeavour.

What can I say which has not already been said by eminent scientists, scholars and thinkers of this great nation? All that I can do is to compile their thoughts and present them as I see fit and as a tribute to the memories of our *pitṛ*-s and *ma*-tr-s, our ancestors who have made us what we are and who have given us the *vira*-sat (heritage).

The septet contains the following volumes:

- 13. Sarasvati: Civilization***
- 14. Sarasvati: R.gveda***
- 15. Sarasvati: River***
- 16. Sarasvati: Bharati***
- 17. Sarasvati: Technology***
- 18. Sarasvati: Language***
- Sarasvati: Epigraphs***

The enduring nature of the culture of the nation has been a source of awe and inspiration for many generations of scholars.

The lives of the *r.s.i*-s and *muni*-s who contributed to the solidity of the *Bha*-rata *Ra*-s.t.ra is a source of inspiration for generations of students of philosophy, politics, sociology, spiritual studies, economics and culture.

The earlier work, *Sarasvati*, published in 2000 focused on the life-history of River Sarasvati. This set of five volumes follow-up on this work to present a comprehensive survey of the lives of the people who nurtured a vibrant civilization on the banks of River Sarasvati. They were enterprising people who ventured to the banks of River Sindhu and beyond and had established a network of interactions which extended as far as Mesopotamia in the west and Caspian Sea in the north-west.

The River Sarasvati, flowing over 1,600 kms. from Mt. Kailas (*Ma*-nasarovar glacier) and tributaries emanating from *Har*-ki-dun (*Svarga*-rohin.i or Bandarpunch massifs, Western Garhwal, Uttaranchal), through Kashmir, Uttaranchal, Himachal Pradesh, Punjab, Haryana, Rajasthan, and Gujarat made the region lush with vegetation and provided a highway for interactions extending through the Gulf of Kutch, Gulf of Khambat, the Persian and Arabian Gulfs. The story of this riverine, maritime civilization is the story of an enterprising group of people who were wonderstruck by the bounties of nature and had organized themselves into a cooperating society to

harness the bounties of nature. The Samudra manthanam imagery wherein the asura-s and deva-s cooperate in churning the ocean for its riches is an allegory of this quest for material well-being while strengthening societal bonds.

This march of history is a saga of adventure, a passion for discovery of new materials and new methods of communication using a writing system and communicating orally profound thoughts on the cosmic order in relation to humanity.

The next stop is Dharma: a history of Bharatiya Ethos and Thought.

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Kaliyugabda 5105. a_s.a_d.ha, Gurupurnima. July 13, 2003 CE

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R.gveda and Sarasvati

Association of Sarasvati with water

Sarasvati_. The legend shown on Bhita sealing, together with a ghat.a. Indian Museum, Calcutta No. A. 11254-NS. 1958 The association of Sarasvati_ with a ghat.a, water-pot is significant and relates to River Sarasvati_.

Sarasvati is associated with water in the R.gveda. She is adored in 72 r.ca-s or r.k-s. River Ganga finds only one mention in the tenth man.d.ala.

It is generally accepted that the R.gveda was composed on the banks of River Sarasvati in the Sapta Sindhu region, that is, north-western Bharat in the doab between Rivers Ganga and Sindhu.

“The hymns themselves allude in clearest language to songs of old that were composed by the Rishis of the past. The later poets undertake to compare, more or less boastfully or complacently, their own compositions with those of the ancient masters... Such reports are significant because they show that the Vedic poets were aware of the fact that Rig-Vedic composition stretched over a long period, preceding their own time. The suggestion has also been made that hymns which refer to themselves as ‘new’, as ‘having been patterned after old’, as ‘having been made in the manner in which Atri, Kan.va, Jamadagni, and other worthies made their hymns’, are of recent origin. In the light of the materials which are worked up in this book [i.e., the repetitive formulaic expressions in the R.gveda], I have grown more skeptical as to our judgement in these matters...it is very often easy to point out signs of relative lateness, but I have yet to find any hymn in the collection which show positive signs of coming from the archetype period, that is to say, from the period when the hymns of this sort were first composed... In any case they one and all

abound in repetitions. Many hymns of the praga_tha collection of Kan.va and the numerous kan.vids are most certainly late clap-trap, but the important role which these hymns play in the Sa_ma-Veda cannon should warn us from condemning the rather banal compositions of the eighth book, because this involves the condemnation of the Sa_ma-Veda to a late date.” (Maurice Bloomfield, 1916, *Rig-Veda repetitions: the repeated verses and distichs and stanzas of the Rig-Veda in systematic presentation and with critical discussion*, 1-2 and 3. Harvard Oriental Series, 20, 24, Cambridge, Mass.: 20-21; cf. *ibid.* 639-40).



EW Hopkins (1896, Praga_thika_ni, I, *JAOS*, 17: 23-92) presented a list of words which occur in the 8th book and not elsewhere in the R.gveda; he noted that the differences are not just lexical, but include cultural and geographic background and proper names (pp. 84-8). Ka_n.va hymns refer to sheep, agriculture, ploughing and the 8th book has many word with retroflex consonants. Decendant of Yadu (ya_dva) is mentioned in RV 7.19.8.

Georges-Jean Pinault (1998, Le nom indo-iranien de l’hôte, in *Meid*, 1998: 451-77: 453-5) provides the parallels between the Ka_n.va hymns and Mitanni proper names (ca. 1500 to 130 BCE): five proper names end in –atithi ‘guest’: Medhya_tithi, Medha_tithi, Ni_pa_tithi, Mitra_tithi and Deva_tithi. These names parallel the Mitanni bahu_vri_hi proper names ending in –att(h)i ‘having X as his guest’: Biriatti/Priya_tt(h)i-/ , Mittaratti/Mitra_tt(h)i-/ , As’uratti/Asura_tt(h)i-/ , Mariatti/Marya_tt(h)i-/ , S’uriatti/Su_rya_tt(h)i-/ , Intaratti/Indra_tt(h)i-/ , Paratti/Pra_tt(h)i-/ and S’u_atti/Suvatt(h)i-/ . Pinault goes on to determine the early semantic of **atithi**: ‘who stays nearby, who is placed next to (the house of the host)’.

Surely, the Mitanni was **nearby** Bharat, the region of Bharata-s! And, there is no reason to postulate an Iranian locus for Ka_n.va. In a

dialectical continuum, the Old Indo-Aryan (ancestral to Epic and Classical Sanskrit) was intelligible to Old Vedic. [See Asko Parpola, 2002, Pre-Proto-Iranians of Afghanistan as initiators of s'a_kta tantrism: on the Scythian/saka affiliation of the da_sas, Nuristanis and Magadhans, *Iranica Antiqua*, Vol. XXXVII, ed. DT Potts, GENT]

The traditions associated with R.gveda pre-date the Sarasvati civilization exemplified by over 2,000 archaeological sites on the banks of the River Sarasvati.

Veda is a word derived from the root *vid* 'to know'. In the Bharatiya tradition, Sarasvati is associated with knowledge, and with arts and crafts. On the banks of river Sarasvati arose what is perhaps the world's first human document, the R.gveda.

R.k means 'mantra'. The contemporaneous traditions of *yajus*. 'yajñ-a', *sa_man* 'song', *atharvan* 'fire', *dhanus* 'bow', *s'ilpa* 'sculpture' and *a_yus*. 'life' are documented respectively in: *Yajurveda*, *Sa_maveda*, *Atharvan.aveda*, *Dhanurveda*, *S'ilpaveda* and *A_yurveda*.

Two metaphors

R.gveda is riddled with metaphors. According to Yaska, even the divinities are metaphors.

Two recurrent metaphors relate to: **soma** and **ratha**.

Soma is a metaphor denoting metallurgical processing and purification of electrum. **Ratha** is a metaphor of time, governed by the motion of celestial bodies; it is also a metaphor for a celestial vehicle, denoting the process of carrying the electrum ores into the fire-altar, the **vedi** to achieve the timely fulfillment of the desire to acquire **amr.tam**, immortality.

Of the ten man.d.ala-s of R.gveda, an entire man.d.ala, the eighth, is devoted to processing **soma**. **Soma** is the only commodity the

processing of which is elaborated in great detail in the R.gveda. The entire Sa_maveda is devoted to **Soma**. An understanding of the metaphor of *soma* is central to the understanding of the Vedic tradition in Bharat and later in the Avestan tradition of *haoma*. The Avestan *haoma* is cognate with Vedic *homa*, a process of working with fire-altar or *vedi*.

While it is clear that R.gveda and other texts in the Vedic tradition – the *Veda-s*, *Upanis.ad-s*, *Bra_hman.a-s*, *A_ran.yaka-s*, *Su_tra-s*, *Itiha_sa* in *Ra_ma_yan.a* and *Maha_bha_rata* and the *Pura_n.a-s* – are a very complex set of documents which can be studied at different levels of knowledge: cosmic-spiritual, temporal and material levels, an attempt will be made in this work to understand the processing of **soma** in the context of later-day technological traditions which evolved on the banks of River Sarasvati and neighbouring regions.

A tradition evolved in Bharat treating many metal objects and weapons as *pavitram*, auspicious or sacred. The word, *pavitram* has a special significance in R.gveda in the context of soma processing. *Pavitram* connotes a 'filter' to purify the 'artifacts' brought out of the *vedi* or fire-altar after the yajñ-a.

Vedic roots of early metallurgy

Apa_m phena as a weapon

RV 8.14.13 mentions apa_m phena; this is described as a weapon which Indra hurls at Namuci. The Bra_hman.a tradition has a legend: Indra drinks sura_ at Namuci's residence and falls ill. Indra is then cured by Sarasvati_. The Sautra_man.i_ is performed for a person from whose nose, ears etc. Soma flows out. 'Soma flows out, the so-called somapu_ta, further for a brahmin who desires success, for an exiled king, for a ks.atriya and so on, and is performed in a typical fashion...Further we find Namuci's name in a formula; during the consecration ceremony of the king, uttering this formula, kicks with his foot a piece of lead that has been kept on the tiger skin. (nirastam namuceh s'irah: TS 1.8.14; TBr 1.7.8.2; S'Br 5.4.1.9; MS 4.4.4 (54.5)...The comm. on TS says: **lohita_yasam ta_mram pu_rvam phenena pa_titam yan namuceh s'iras tad idam ta_mraru_pam san nirastam parityaktam**)...In the Va_japeya and here in the Sautra_man.i_ the Parisrut is bought against lead from a long-haired man...Indra makes a compact with Namuci...It is the well known compact (MS 4.3.4 (43.7)(cf. MBh 9.43.34) not to injure Namuci either with a dry object or with a wet one, either in daylight or at night...Indra breaks the oath and kills this opponent apa_m phenena...I would think that the apa_m phena should be understood in the sense of some solid material and that it denotes some substance like, e.g. lead, because this very metal serves, as we saw, as the purchasing price in the sura_ ceremonies. In the context of removing the old fire, Kaus'ika Su_tra LXXI.15 states that one should place si_sa_ni in the hands of the eldest son, and the commentary explains this word as si_sam nadi_phenam

lohamr.ttika_. Kaus'ika Su_tra VIII.18 lists **si_sa, nadi_si_sa** (comm. **nadi_phenapin.d.a**), **ayorajas, kr.kala_sas'irah** among the things called 'lead', but not among the immediately following rasas (like **dadhi** and **ghr.ta**)."[Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, vol. II, pp. 148-149].

Trita, soma-presser

Vedic Trita and Avestan Tritha are Soma pressers. Bhr.gus arise from the flames of Praja_pati's seed; An:giras arise from the coals and Trita has his origin in the waters. In such an interpretation, Trita may be seen as the name of an ancestor (like Kutsa or Kan.va).

स त्रितस्याधि सानवि पवमानो अरोचयत् ।

जामिभिः सूर्य सह ॥

9.037.04 The pure Soma upon the high place (of the sacrifice) of Trita, attended by its kindred rays, has lighted up the Sun.

Macdonell explains Trita as god of lightning. (Macdonell, *Mythological studies in the R.gveda*, JRAS, 1893, XXV, pp. 419-96). Trita is attributed with the name a_ptya (Note the concordance with Yas.t A_twya; cf. Bartholomae, IF, I, p. 180; Johansson, *Bidrag till Rigvedas Tolkning*, p.7).

There is a legend narrated in the R.gveda about Trita a_ptya; Trita is at the bottom of the well and connected with water. The motif of the well occurs not only about Trita (or Kutsa) but also about Bhujyu (RV 1.116.4; 117.14; 118.6; 182.6; 7.68.7), Atri (RV 1.116.8; 117.3) , Rebha and Vandana (RV 1.112.5; 116.24; 117.4; 119.6; 10.39.8-9). Water oblations are poured for three A_ptyas: Trita, Dvita and Ekata, to the north of the Viha_ra. (S'Br. 13.4.2.16; cf. Hillebrandt, vol. 2, n. 627). "In the R.V as well as in later times, the plural form of a_ptya_h is the name of an entire class of beings -- gods or men -- who stand in AitBr.

VIII.12.4 next to the Sa_dhyas and between the Vasus, Rudras, A_dityas on the one side and the Maruts and An:giras on the other...These apart, the legend of the buried disc, bowl or treasure may be mentioned." (Hillebrandt, vol.2, p. 194, n. 626).

The r.cas 8.047.13 to 18 explain how Trita A_ptya takes the sin and evil effects upon himself. Avesta notes a thrita, while the R.V mentions trita and dvita. ["...Iranian Thritha, who is regarded as a healer and who received a thousand healing plants from Ahuramazda...Trita...its connection with the Old IRisih triath, 'ocean' (Fick, VWB 4th edn., I, p. 63; Johansson, IF, IV, p. 143) appears as uncertain as the derivation from tri, 'three'." Hillebrandt, vol.2, p. 195, n. 631).

यद् अ॒विर् यद् अ॒पी॒च्यं दे॒वा॒सो अस्ति॑ दुष्कृतम् ।
 त्रि॒ते तद् विश्व॑म् आ॒स्य अ॒रे अ॒स्मद् द॒धात॑नाने॒हसो॑ व
 ऊ॒तयः॑ सू॒तयो॑ व ऊ॒तयः॑ ॥
 यच् च॒ गोषु॑ दु॒ष्वप्य॑ यच् चा॒स्मे दु॒हित॑र् दि॒वः ।
 त्रि॒ताय॑ तद् वि॒भाव॑यूर् आ॒स्याय॑ परा॒ वह॑ने॒हसो॑ व
 ऊ॒तयः॑ सू॒तयो॑ व ऊ॒तयः॑ ॥
 निष्कं॑ वा॒ घा कृ॑णव॒ते स्रजं॑ वा दु॒हित॑र् दि॒वः ।
 त्रि॒ते दु॒ष्वप्य॑ सर्व॑म् आ॒स्ये परि॑ द॒द्वस्य॑ अ॒नेह॑सो॑ व
 ऊ॒तयः॑ सू॒तयो॑ व ऊ॒तयः॑ ॥
 तद॑न्नाय॒ तद॑प॒से तम् भा॑गम् उ॒पसे॑दुषे ।
 त्रि॒ताय॑ च द्वि॒ताय॑ चोषो॑ दु॒ष्वप्य॑ वह॑ने॒हसो॑ व ऊ॒तयः॑
 सू॒तयो॑ व ऊ॒तयः॑ ॥
 यथा॑ क॒लां यथा॑ श॒फं यथ॑ ऋ॒णं संन॑याम॒सि ।
 ए॒वा दु॒ष्वप्य॑ सर्व॑म् आ॒स्ये सं न॑याम॒स्य अ॒नेह॑सो॑ व
 ऊ॒तयः॑ सू॒तयो॑ व ऊ॒तयः॑ ॥
 अ॒जैष्मा॑द्यास॒नाम॑ चा॒भूमा॑ना॒गसो॑ व॒यम् ।
 उषो॑ यस्मा॑द् दु॒ष्वप्य॑द् अ॒भैष्मा॑प॒ तद् उ॑च्छ॒त्स्व
 अ॒नेह॑सो॑ व ऊ॒तयः॑ सू॒तयो॑ व ऊ॒तयः॑ ॥

8.047.13 Deities, whatever evil is manifest, whatever is concealed, (let it be not found) in Trita A_ptya, keep it far from us; your aids are void of harm, your aids are true aids. [Trita A_ptya is the r.s.i of the hymn. Trita A_ptya was a deity dwelling in remote distance, and consequently evil was sought to be transferred to him; keep it far from us in Trita A_ptya].

8.047.14 Daughter of heaven, (Us.as), whatever ill-omened dream threatens our cattle, keep it, O brilliant one, far from Trita A_ptya; y our aids are void of harm, your aids, are true aids. [Far from Trita A_ptya: trita-ya a_ptya_ya: keep it far away for Trita A_ptya; R.cas 14 and 15 are used in A_s'vala_yana's Gr.hy Su_tras to be recited after an unpleasant dream].

8.047.15 Daughter of heaven, whatever ill-omened dream threatens Trita A_ptya, we transfer it to the worker of gold ornaments or to the maker of garlands; your aids are void of harm, your aids are true aids. [Whatever evil dream threatens the worker of gold ornaments or the maker of garlands, that evil, abiding in Trita A_ptya (or the son of the waters), we Tr.tas throw off from ourselves; i.e. we throw it off on Trita A_ptya].

8.047.16 Us.as, bear (elsewhere) the ill-omened dream for Trita and Dvita, who eat and do (in dreams) that (which is eaten and done amiss when awake) and who obtain that (inauspicious) portion; your aids are void of harm, your aids are true aids. [Bear elsewhere: i.e., let the eating of honey etc., perceived in a dream, produce happiness as in a waking state; trita and dvita: for dvita, cf. S'atapatha Bra_hman.a 1.2.3.1].

8.047.17 As (in the sacrifice) we put severally together the proper parts and the hoofs, and as we discharge a debt, so we transfer all the ill-omened dream that rests on A_ptya; your aids are void of harm, your aids are true aids. [As in the sacrifice they place together the kala_, the heart etc., as fit to be cut to pieces, and the s'apha, the hoof, bones etc. as unfit; another explanation is: kala_ = s'apha or hoof. The words kala_ and s'apha occur together in Taittiri_ya Sam.hita_ 6.1.10, where the process of buying the Soma is described; s'apha = the

eighth part of a cow; kala_ = a very small portion of a cow; that rests on A_ptya: or, we transfer all the ill-omened dream to A_ptya].
8.047.18 May we be today victorious, and obtain (happiness); may we be free from evil; Us.as, may that ill dream depart, of which we were afraid; your aids are void of harm, your aids are true aids.

The R.gveda su_kta 1.105 is by r.s.i: trita a_ptya or kutsa a_n: girasa; devata_: vis'vedeva_; chanda: tris.t.up

चन्द्रमा अप्स्व अन्तर् आ सुपर्णो धावते दिवि ।

न वो हिरण्यनेमयः पदं विन्दन्ति विद्युतो वित्तम् मे

अस्य रौदसी ॥

1.105.01 The graceful-movingmoonspeeds along the middle region in the sky; bright golden rays (my eyes) behold not your abiding-place. Heaven and earth, be conscious of this (my affliction). [candrama_h suparn.ah: suparn.aih = s'obhana-patana, the elegantly-going; or, possibly connected with the ray of the sun called supran.a, which gives the moon its light; your abiding place: a reference to the supposed position of Trita at the bottom of the well, which, being covered over, shuts out from him all visible objects; be conscious of this: the text has, 'heaven and earth, know of this of me' (vittam me asya rodasi), i.e. 'be aware of this my affliction', or, 'attend to this my hymn'].

अमी ये सप्त रश्मयस् तत्रा मे नाभिर् आतता ।

त्रितस् तद् वेदास्यः स जामित्वाय रेभति वित्तम् मे

अस्य रौदसी ॥

1.105.09 Those which are the seven rays (of the sun), in them is my navel expanded; Trita, the son of the waters, knows that (it is so), and he praises them for his extrication (from the well). Heaven and earth, be conscious of this (my affliction). [na_bhi = navel; tes.u su_ryaras'mis.u adhya_tmam saptapra_n.aru_pen.a varma_nes.u, identifying the solar rays with the seven vital airs abiding in the ruling spirit; this is perhaps an allusion to the navel as the seat of the soul. Son of the

waters: a_ptya = a_pya = apa_m putra, son of the waters].

त्रितः कूपे ऽवहितो देवान् हवत उतये ।

तच्च छुश्राव बृहस्पतिः कृण्वन् अह्वरणाद् उरु वित्तम् मे अस्य रौदसी ॥

अरुणो मा सकृद् वृकः पथा यन्तं दुदर्श हि ।

उज् जिहीते निचाय्या तष्टेव पृष्ठायामयी वित्तम् मे अस्य रौदसी ॥

1.105.17 Trita, fallen into the well, invokes the Gods for succour; Br.haspati, who liberates many from sin, heard (the submission). Heaven and earth, be conscious of this (my affliction).

1.105.18 Once, a tawny wolf beheld me faring on my way, and having seen me, rushed upon me, (rearing) as a carpenter, whose back aches (with stooping, standing erect in his work). [The wolf, like the carpenter, was u_rdhva_bhimukha (standing in presence erect). If vr.ka = moon and ma_sakr.t (me once) is rendered ma_sakr.t (month-maker), the rendering is: the moon, having contemplated the constellations goind along the path of the sky, became united with one of them; paying, therefore, no attention to Trita in the well].

यद् अक्रन्दः प्रथमं जायमान उद्यन् समुद्राद् उत वा

पूरीषात् ।

श्येनस्य पक्षा हरिणस्य बाह्व उप्स्तुत्यम् महि जातं ते

अर्वन् ॥

यमेनं दुत्तं त्रित एनम् आयुनग् इन्द्र एणम् प्रथमो

अध्य अतिष्ठत् ।

गन्धर्वो अस्य रशनाम् अंगृभ्णात् सूर्याद् अश्वं वसवो

निर् अतष्ट ॥

1.163.02 Trita harnessed the horse which was given by yama; Indra first mounted him, and gandharva seized his reins. Vasus, you fabricated the horse from the sun. [Trita = Va_yu, as pervading the three regions; Yama = Agni; gandharva = Soma; Vasus = demi-god or

personified solar rays; su_ra = a_dityaman.d.ala, the solar sphere].

1.163.03 Your horse is Yama and you are A_ditya; you are Trita by a mysterious act; you are associated with Soma. The sages have said there are three bindings of you in heaven. [By a mysterious act: guhyena vratena gopani_yena, durdina ru_pen.a va_ karman.a_ sarvatra vya_ptiru_pen.a, by a secret nature of a cloudy day, or an act of a universally penetrating character; the three bindings: bandhana_ni tri_n.i = utpattika_ran.a_ni, media of origin, that is the Vasus, A_ditya and heaven].

पितुं नु स्तोषम् महो धर्माणं तविषीम् ।

यस्य त्रितो व्य् ओजसा वृत्रं विपर्वम् अर्दयत् ॥

1.187.01 I glorify Pitu, the great, the upholder, the strong, by whose invigorating power Trita slew themutilated Vr.tra. [Anna-devata_ = anna, the divinity presiding over food, or merely food; pitu = pa_lakam, that which nourishes; Trita = Indra; he whose fame is spread through the three worlds; or, tr.stha_na-indraha, the three-stationed Indra: Yajurveda 34.7].

अभि स्ववृष्टिम् मदे अस्य युध्यतो रघ्वीर् इव प्रवणे
संस्तुर उतयः ।

इन्द्रो यद् वज्री धृषमाणो अन्धसा भिनद् वलस्य

परिधीर् इव त्रितः ॥

1.052.05 His allies, exhilarated (by libations), preceded him, warring against the withholder of the rain, as rivers rush down declivities. Indra, animated by the sacrificial food, broke through the defences of Vala as did Trita through the coverings (of the well). [paridhi_r iva tritah: tritah, triple or threefold; hence, 'as through triple coverings or defences'. A legend is: Ekata, Dvita and Trita were three men produced in water by Agni, for the purpose of removing or rubbing off the relics of an oblation of clarified butter (like three blades of sacred grass used to rub off. Another legend: Agni threw the cinders of burnt-offerings into water, whence arose Ekata, Dvita and Trita (called A_ptyas or sons of water). Trita went to draw water from a

well and fell into it; Asuras heaped coverings over the mouth of the well to prevent his escape, but he broke through them. Indra's breaking through the defences of Vala, the asura is compared to this exploit of Trita].

Soma and metals

R.gveda: References to Metallurgy

taks.a, tvas.t.r., r.bhu

Tvas.t.r. is the master craftsman of the gods. The tr.ca RV 7.34.20-22 is dedicated to him. He is mentioned in RV 8.26.21,22; 102.8 and RV 9.5.8; 81.4. The word is derived from tvaks. = taks. using the play on words tvas.t.a_ tataksa. [Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, II, pp. 233 ff.]. Vis'varu_pa is the son of Tvas.t.r. Tvas.t.r. causes Br.haspati to be born from all beings, from every seed. (cf. Hillebrandt, II, p.238).

अविष्ट्यौ वर्धते चारुर् आसु जिह्मानाम् ऊर्ध्वः स्वयंशा
उपस्थे ।

उभे त्वष्ट्र बिभ्यतुर् जायमानात् प्रतीची सिंहम् प्रति
जोषयेते ॥

1.095.05 Appearing amongst them (the waters), the bright-shining (Agni) increases, rising above the flanks of the waving waters, spreading his own renown; both (heaven and earth) are alarmed, as the radiant Agni is born, and, approaching the lion, they pay him honour. [above the flanks of the waving waters: jihma_na_m apa_m upasthe, above, on the side, or tip, of the crooked waters; reference to Agni as the lightning; approaching the lion: sim.ha applied to Agni, implying sahanas'i_lam, abhibha_vana s'i_lam, ability to suffer or be overcome]. [Alt. Hillebrandt (II, p.238): Visible, the lovely one grows in these (waters), rising up with full splendour in the lap of the recumbent ones. Both (heaven and earth) were frightened of (the son of) Tvas.t.r when he was born; turning to him, they fondled the lion...It is

obvious that Agni 'who rises up in the lap of the recumbent ones' and who grows in the waters is none else than the Yuva_ kavir gos.u, apsu drapso va_vr.dha_nah, 'the one eye which the rivers cause to grow', i.e. the young waxing moon and that he is a mythological parallel to Apa_m napa_t. In two more passages Tvas.t.r is said to be the father of Agni. (RV 10.46.9; 2.7).

त्वष्टा माया वैद् अपसाम् अपस्तमो बिभ्रत् पात्रा

देवपानानि शूलततमा ।

शिशीते नूनम् परशुं स्वायसं येन वृश्वाद् एतशो

ब्रह्मणस् पतिः ॥

10.053.09 Tvas.t.a_ knows the arts of fabricating (drinking vessels), the most skilful of artificers bearing the sacred drinking cups out of which the gods drink-- verily he sharpens his axe of good metal, wherewith the white-complexioned brahman.aspati cuts them.

[Alt. Hillebrandt (p. 234): Tvas.t.r knew the magic when he, most skilful of the skilful, brought the salutary bowls from which the gods drink. Now he sharpens the axle of metal with which the swift Brahman.aspati will carve.] Maybe this bowl is connected with the bowl made fourfold by the R.bhus, a bowl which is the object of battle between the R.bhus and Tvas.t.r, who wishes to kill the former because they find fault with his bowl. (RV 1.20.6; 110.3; 5; 161.4; 5; 4.33.5,6; the vas'a_ brought the Soma in three bowls: AV 10.10.2). RV 10.53.9 notes that the gods drink from Tvas.t.r's several vessels. AV 10.4.3-6 notes that Tvas.t.r carries a bowl full of Soma. The bowls of R.bhus are camasa_ vibhra_jama_na_h (RV 4.33.6).

Tvas.t.r becomes envious of the achievements of the R.bhus and hides among the women. TS 6.5.8.4: deva_ vai tvas.t.a_ram ajigha_m.san sa patni_h pra_padyata tam na prati pra_yacchan. (cf. RV 1.22.9; 2.1.5; 31.4; 6.50.13; 7.34.20; 1.64.10; MS 2.5.5. (54.14); 4.14.9 (228.1ff.); S'Br 1.9.2.10-11). Nes.t.r. belongs to the ritual of the Tvas.t.r and is mentioned in RV 1.15.3 in the place of Tvas.t.r. In the association with women, Tvas.t.r. is seen as the genius of

fertility who bestows a pious and god-fearing son (VS 29.9 (TS 5.5.1.11); RV 2.3.9); he confers procreative power upon human beings (RV 1.142.10; MS 4.14.9 (228.12). RV 1.188.9 notes: tvas.t.a_ ru_pa_ni prabhuh pasu_n vis'va_n sama_naje, 'Tvas.t.r the mighty has indeed created the forms and all the animals. (cf. RV 3.55.79; 10.110.9; 184.1). He is indeed the master-craftsman of the gods: sukr.t, supa_ni, sugabhasti, svapas. (RV 1.85.9; 3.54.12; 6.49.9; 7.34.20). In RV 7.29.3, he carves Indra's vajra, sharpens Br.haspati's axe and himself wields a hatchet. (AV 12.3.3: tvas.t.reva ru_pam sukr.(VS 29.9; AV 6.92.1) and bestows with his wives, speed upon the chariot (RV 2.31.4). He is identified with va_c in ABr 2.4.13: va_g vai tvas.t.a_ va_g ghi_dam sarvam ta_s.t.i_va.

चक्रवृलतसं ऋभवस् तद् अपृच्छत् वेद् अभूद् यः

स्य दूतो न आजगन् ।

यदावाख्यं चमसाञ् चतुरः कृतान् आद् इत् त्वष्टा

भास्व् अन्तर् न्य् आनजे ॥

1.161.04 So doing R.bhus, you inquired: where, indeed, is he who came to us as a messenger? When Tvas.t.a_ observed the one ladle become four, he was immediately lost amongst the women. [gna_su antarnya_naje; the verb is explained: nyakto abhu_t; the combination of ni and anj is perhaps the converse of vyan~j, to be manifest, i.e. to be concealed, indistinct, or invisible. gna_ = stri_(mena gna_ iti stri_n.a_m--Nirukta 3.21); str.yam a_tma_nam amanyata = he, Tvas.t.a_, fancied himself; woman, that is, he felt humbled, as feeble as a female].

अभि वो अर्चे पोष्यावतो नृन् वास्तोष् पतिं त्वष्टारं

रराणः ।

धन्या सजोषा धिषणा नमोभिर् वनस्पतीओषधी राय

एषे ॥

5.041.08 I glorify you, leaders (of rites), cherishers (of many), gratifying (with oblation, you) Tvas.t.a_ the lord of foundations, and the goddess of speech, bestower of opulence, and

share in the satisfaction (of the other divinities); also the lords of the forest, and the herbs, that I may obtain riches. [Alt. Hillebrandt (p.235): I implore you, O men who grant prosperity, and with rich gifts (I implore) the lord of the house, Tvas.t.r.]

दशेमं त्वष्ट्रं जनयन्त गर्भम् अतन्द्रासो युवतयो विभ

त्रम् ।

तिग्मानीकं स्वयंशसं जनैषु विरोचमानम् परि षी

नयन्ति ॥

1.095.02 The vigilant and youthful Ten beget, through the wind, this embryo Agni, inherent (in all beings), sharp-visaged, universally renowned, shining among men; him they conduct (to every dwelling). [Ten: the ten regions of space, which generate lightning, as an embryo in the clouds, using the winds: agner hi va_yuh ka_ran.am, va_yor agnih, wind is the cause of fire, fire of wind. Tvas.t.uh = wind or its agency: dipta_nmadhyama_d va_yoh sa_kas.a_t, the brilliant central proximity of wind. Ten: the ten fingers which generate Agni through the act of attrition as an embryo in the sticks. vibhr.tram = deposited in all creatures, i.e. inheret]. [Alt. Hillebrandt (p. 235): "(the) ten produced the infant of Tvas.t.r., the indefatigable maidens (produced the one who is) much distributed. They carry him around among men, him whose visage is sharp, who is full of fame and shining". The ten fingers of the householder produce the fire which is distributed in his abodes. Indra seizes the Soma drink in Tvas.t.r.'s house and the frightened Tvas.t.r. flees away: RV 1.80.14; 3.48.4; 4.18.4 Su_rya's daughter cleanses the Parisrut for Indra, who enjoyed Soma in the house of Vis.n.u --the sun god-- also (RV 8.3.8; 12.16; 10.113.2).]

पुरु यत् त इन्द्र सन्त्य उक्था गवै चकथोर्वरासु

युध्यन् ।

ततक्षे सूर्याय चिद् ओकसि स्वे वृषा समत्सु दासस्य

नाम चित् ॥

5.033.04 Inasmuch, Indra, as many praises are yours, therefore, combating for the sake of (shedding) water on fertile (lands), you have effected (the discomfiture of its obstructors); you, who are the showerer (of benefits), have on behalf of the sun, destroyed in his own dwelling the very name of (the asura), Da_sa, in battle. [Hillebrandt (p.236): seeing a parallel to RV 3.48.4, tvas.ta_ram indro janus.a_bhibhu_ya and RV 1.80.14, tvas.ta_cid tava manyava indra vevijyate bhiya_, agrees with Ludwig's translation (Über die Erwa_hnung von Sonnenfinstern.issen..., p.9): 'He with the strength of an ox caused the name of a Da_sa for Su_rya in the course of a battle even in his own house']. Tvas.t.r. gets the name of a Da_sa from Indra.

Tvas.t.r.'s cows are kept in the moon's house? Or is candramas a synonym of indu, i.e. Soma? i.e. Soma, in whose house the cows or 'wealth' is present.

अत्राह गोर् अमन्वत् नाम त्वष्ट्र अपीच्यम् ।

इत्था चन्द्रमसो गृहे ॥

1.084.15 The (solar rays) found on this occasion the light of Tvas.ta_ verily concealed in the mansion of the moving moon. [The text has only 'they found'; A_ditya-ras'mayah, rays of the sun is added. Tvas.ta_ = the Sun, an A_ditya; also, identified with Indra, to whom the hymn is addressed. 'The rays of the sun are reflected back in the bright watery orb of the moon'; 'the solar radiance, concealed by the night, enters into the moon, and thus dispels darkness by night, as well as by day'. One ray of the sun (that named s'us.umna_ lights up the moon; therefore, moon's light is derived from the sun (Nirukta 2,6)(cf. Vis.n.u Pura_n.a 36)]. [Alt. Hillebrandt (II, p.237): 'in the moon's house indeed one knew the secret name of Tvas.t.r.'s cow'. The Tvas.t.r.'s cows are in the house of the moon and his son Vis'varu_pa guards these cows.]

Tvas.t.r.'s son has, in his custody, the cows and Tvas.t.r. possesses Madhu as well as Soma. Both Madhu and Soma connote celestial ambrosia, amr.ta. In RV 10.49.10 Indra boasts how he has understood better than Tvas.t.r. how

to deposit the Amr.ta in the cows. go, madhu and soma are cognate terms and denote ambrosia, notes Hillebrandt. (II, p.237).

अहं तद् आसु धारं यद् आसु न देवश् चन
त्वष्टाधारयद् रुशत् ।

स्पार्हं गवाम् ऊधस्सु वक्षणास्व आ मधोर् मधु श्वाच्यं
सोमम् आशिरम् ॥

10.049.10 I have kept up in them that which no deity, not even Tvas.ta.a_, has maintained, bright, desirable, (contained) in the udders of the cows; in the rivers (I uphold) the water up to the (source of the) water, the delightful Soma and the milk and curds. [In them that: them, means the cows and that, means the milk; upto the source of the water: a_ madhoh]. [Alt. Hillebrandt (II,p.410): I preserved in them what no god, not even Tvas.t.r, preserved; the bright and the much-sought-after (milk) of the cows in the udders, in the teats, which is sweeter than honey (?), the tasteful Soma, the A_s'ir]

आथर्वणायाश्चिना दधीचे ऽश्व्यं शिरः प्रत्य् ऐरयतम् ।

स वाम् मधु प्र वौचद् ऋतायन् त्वाष्ट्रं यद् दस्त्राव्
अपिकृक्ष्यं वाम् ॥

1.117.22 You replaced, As'vins, with the head of a horse, (the head of) Dadhyan~c, the son of Atharvan, and, true to his promise, he revealed to you the mystic knowledge which he had learned from Tvas.ta.a_, and which was as a ligature of the waist to you. [Tvas.ta.a_ = Indra; the knowlege was kaks.yam. va_m = a girdle to you both; strengthening them to perform religious rites]. [Alt. Hillebrandt (p.236): To Atharvan's son Dadhyan~c you have attached, O As'vins, the horse's head. The pious (one) revealed to you Tvas.t.r.'s honey, O wonder-workers, which was hidden even to you.]

At the command of Indra, Trita kills Tvas.t.r.'s son and drives out the cows. (cf. RV 2.11.19):

स पित्र्याण्य् आयुधानि विद्वान् इन्द्रेषित आस्यो अम्य्
अयुध्यत् ।

त्रिशीर्षाणं सप्तर्शिं जघन्वान् त्वाष्ट्रस्य चिन् निः
संसृजे त्रितो गाः ॥

भूरीद् इन्द्र उदिनक्षन्तम् ओजो ऽवाभिनत् सत्पतिर्
मन्यमानम् ।

त्वाष्ट्रस्य चिद् विश्वरूपस्य गोनाम् आचक्राणस् त्रीणि
शीर्षा परा वक्त्र ॥

10.008.08 He, the son of the waters, incited by Indra, skilled in his paternal weapons, fought against (the enemy), and slew the seven-rayed, three-headed (asura); then Trita set free the cows of the son of Tvas.ta.a_.

10.008.09 Indra, the protector of the virtuous, crushed the arrogant (foe), attaining vast strength; shouting, he cut off the three heads of the multiform son of Tvas.ta.a_ (the lord) of cattle. [Shouting: s'abdam kurvan; gona_m acakra_n.ah, appropriating the cattle]. [Alt. Hillebrandt (pp.II, 236-237): Well-versed in (the use of) the weapons of his father, Trita A_ptya, urged on by Indra, attacked him. Then Trita slew the three-headed and seven-rayed (enemy) and freed the cows of Tvas.t.r.'s son. Indra struck him down who attributed great strength to himself, the true lord (struck) him who considered himself to be such. He seized the cows of Vis'varu_pa son of Tvas.t.r and tore off his three heads. [Tvas.t.r.'s son is called goarn.as, 'rich in cows' in RV 10.76.3 goarn.asi tva_s.t.re as'vanirn.iji prem adhvars.v adhvara_n as'is'rayuh (as'vanirn.ij = adorned with horses); in RV 3.7.4: mahi tva_s.t.ram u_rjayanti_r ajuryam stabhu_yama_nam vahato vahanti vy angebhir didyuta_nah sadhastha eka_m iva rodasi_a_vives'a, 'the streams, growing mightily, carry forth Tvas.t.r.'s yothful son who is leaning heavily'. Should we add 'madhu' here?]

Va_yu is noted as Tvas.t.r.'s son-in-law:

तव वायव् ऋतस्पते त्वष्ट्रं जामातर् अद्भुत ।

अवांस्य् आ वृणीमहे ॥

त्वष्ट्रं जामातरं वयम् ईशानं राय ईमहे ।

सुतावन्तो वायुं द्युम्ना जनासः ॥

8.026.21 We solicit your protection, Va_yu, lord of sacrifice wonderful son-in-law of Tvas.t.a_. [Tvas.t.a_: i.e. Brahma_; or, Va_yu, the wind, having taken water from A_ditya, fertilizes it, as rain, and is, therefore, as it were, his son-in-law, identifying Tvas.t.a_ with A_ditya (Yajus. 27.34)].

8.026.22 We, the offerers of Soma, solicit riches from the sovereign, the son-in-law of Tvas.t.a_; (may we become) wealthy. [Alt. Hillebrandt (II, p.237): Offering Soma, we invoke Tvas.t.r.'s son-in-law, the lord of riches, Va_yu. Va_yu and Tvas.t.r. are mentioned side by side in RV. 10.65.10; AV 3.20.10; 6.141.1; 9..10; in MS 3.6.9 (73.6), Va_yu is the gopa_, Tvas.t.r. the adhipati and Pu_s.an the pratigrahi_tr.].

In the Rigveda, the lexeme taks.am is used to define composition or fashioning. apu_rvya_purustamanyasmai mahe vi_ra_ya tavase tura_ya; virips'ane vajrin.e s'antama_ni vaca_msya_sa_ sthavira_ya taks.am (RV. VI.32.1): a seer has composed unprecedented, comprehensive and gratifying praises for the mighty Indra. agnaye brahma r.bhavastataks.uh (RV. X.80.7):the fashioning of hymns for agni is done by the r.bhus. Avestan tradition, Ahur Mazda_ is conceived as a carpenter who fashions the earth from wood and who fashions bodies and souls: ga_us'-tas'a_: da_idi mo_i ya_gam ta'so_ apas ca urvaras ca: 'grant me thou -- who has created Mother Earth and the waters and the plants' (Yasna 51.7); hyat na_ mazda_, paourvi_m ga_easca tas'o_ dae_nasca_: 'since for us, O Mazda, from the beginning Thou didst create Bodies and also Souls' (Yasna 31.11)(The Divine Songs of Zarathushtra, pp. 682-3, pp. 210-1). gaus = ga_v (Skt. gau). The phrase mahigauh in RV refers to the earth. Tas'a is from the root tas' (Skt. taks.) = to create, to fashion; to hew, to cut. The cognate lexemes are: technos (Greco-Roman), tas'yati (Lith.)

The gavam-ayanam is a sattra related to the turning of the earth which is related to the solstice or the apparent shift of sun's motion. Maha_vrata day is the last day but one of the

year; it was, as Tilak observed, a link between the dying and the coming year. (Tilak, Arctic Home in the Vedas, p. 122). gavam-ayanam is a sattra similar to a_ditya_na_m-ayanam and an:gi_rasa_m-ayanam. Aitareya Bra_hman.a (iv,17) notes: "They hold the gava_m-ayanam, that is, the sacrificial session called the 'cows' walk'. The cows are the a_dityas (Gods of the months). By holding the session called 'the cows' walk', they also hold the a_ditya_na_m-ayanam (the walk of the a_dityas)." The origin of the sattra is described as follows (Dr. Haug's trans. Vol. II, p. 207): "The cows being desirous of obtaining hoofs and horns held (once) a sacrificial session. In the tenth month (of their sacrifice) they obtained hoofs and horns. They said, we have obtained fulfillment of that wish, for which we underwent the initiation into the sacrificial rites. Let us rise (the sacrifice being finished). Those that rose are those who have horns. Of those who, however, sat (continued the session), saying 'Let us finish the year', the horns went off on account of their distrust. It is they who are hornless (tu_para_h). They (continuing their sacrificial session) produced vigour (u_rjam). Thence after (having been sacrificing for twelve months and) having secured all the seasons, they rose (again) at the end, for they had produced vigour (to reproduce horns, hoofs when decaying. Thus the cows made themselves beloved by all (the whole world), and are beautified (decorated) by all."

The sememe taks. refers to the technical skill of fashioning metallic objects. r.bhus do great deeds and have dexterous hands (svapasah suhasta_h) and frame a chariot for the as'wins (RV.1.111.1; X.39.4), fashion the vigorous horses for Indra (RV. 1.20.2; 1.111.1; III.60.2) and divide the single camasa into four (RV. I.161.2). The r.bhus fabricate the ratha (chariot)(RV. 1.111.1; IV.33.8), fashion agni for manu's sacrifice: dya_tva_ yamagnim pr.thive_ janis.t.a_ma_pastvas.t.a_ mr.gavo yam sahobhih, i_d.enyam prathamam ma_taris'va_ deva_stataks.urmanave yajatram (RV. X.46.) ye as'vina_ ye pirata_ ya u_ti_dhenum tataks.urr.bhavo ye as'va_; ye amsatra_

ya r.dhagrodasi_ ye vibhvo narah svapatya_ni cakruh (RV. IV.34.9): r.bhus fashioned the chariots for as'vins, renovated their parents, restored the cow, fabricated the horses, made armor (am.satra) for the gods, separated earth and heaven and accomplished the acts of good results. Sa_yan.a explains the equivalence of tvaks. and taks. in re: RV. I.100.15: taks.u_ tvaks.u_ tanu_karan.e (to accomplish by reducing, scraping, cutting) in the context of the skills of carpentry, using tools. Taks.a is a professional like the bhis.ak (physician) and priest (Brahman): taks.a_ ris.tam rutam bhis.agabrahma_ sunvantamicchati_ndra_yendo pari srava (RV. IX.112.1) The major wood-work included cutting of the sacrificial stake (yu_pa), fastening of the wooden ring (cas.a_la) on its top and fashioning of the wooden vessels: yu_pa vraska_ uta ye yu_pava_ha_s'cas.a_lam ye as'vayu_pa_ya taks.ati; ye ca_rvate pacanam sambharantyuto tes.a_mabhigu_rtirna invatu (RV. I.62.6) Tvas.t.r. carved the vajra, the weapon wielded by Indra to sever the limbs of vr.ttra (RV. I.32.2; 52.7; 61.6; 121.3; X.48.3; 99.1); it is a_yasam (metallic)(RV. X.48.3) atha tvas.t.a_ te maha ugra vajram sahasrabhr.s.t.im vavr.tacchata_s'rim nika_mamaraman.asam yena navantamahi sam pin.agr.ji_s.in (RV. VI.17.10): fierce Indra, Tvas.t.r. constructed for thee, the mighty one, the thousand-edged, the hundred-angled thunderbolt, wherewith thou hast crushed the ambitious audacious loud-shouting ahi = vr.ttra. RV. I.85.9: tvas.t.a_ yadvajram sukr.tam hiran.yayam sahasrabhr.s.t.im svapa_ avartayat: refers to the shaping of the thunderbolt, vajra, by skilful (svapa_ = s'obhanakarma_); Sa_yan.a explains sukr.tam as samyak nis.pa_ditam or well made; hiran.yayam as suvarnamayam or golden; sahasrabhr.s.t.im as aneka_bhir dha_ra_bhir yuktam or 'of numerous edges'. Tvas.t.r. augments the strength of Indra by fashioning a vajra of overpowering vigour: tvas.t.a_ citte yujyam va_vr.dhe s'avastataks.a vajramabhibh_tyojasam (RV. I.52.7)

The transition from the lithic age to the bronze age is apparent from the description of adze or

va_s'i as either metallic or made of stone and used for shaping wooden vessels: va_s'i_bhiih as'manmayi_bhiih (RV. X.101.10) Rigveda refers to smelter of metals (dhma.ta_: RV. V.9.5) and the smith (karma.ra: RV.X.72.2)[Schrader notes that the names of smiths in IE languages are often derived from the old Indo-Germanic names for stone of which the smiths' tools were originally made; e.g. hamarr (OHG); akmo_n (= anvil)(Gk.); as'man (=hammer, anvil, oven)(Skt.)

Tvas.t.r. is shown sharpening his metallic axe while fabricating the camasa bowl used for soma (apparently, the axe is used to fashion the bowl): s'isi_te nu_nam paras'um sva_yasam (RV. X.53.9) The camasa created by Tvas.t.r. is later divided into four parts by his disciples, the r.bhus: uta tyam camasam navam tvas.t.urdevasya nis.kr.tam (RV. I.20.6); akarta caturah punah (RV. IV.33.5-6)[Commenting on RV. I.20.6, Sa_yan.a says that r.bhus are the disciples of Tvas.t.r.: tvas.t.uh s'is.ya_r.bhavah. Elsewhere, Sa_yan.a refers to Tvas.t.r. as the preceptor of the r.bhus: r.havah tvas.t.a_yus.madguruh (RV. IV. 33.5)]

The reference to ratha is: ratham suvr.tam (RV. I.111.1). Sa_yan.a interprets this as well-built or good-wheeled: s'obhanavartanam sucakram va_ The carpenters' tools are: svadhiti which is used to cut and trim the wooden post: ya_nvo naro devayanto nimimyrvanaspate sva_dhitirva_ tataks.a (RV. III.8.6) va_s'i_ and paras'u are also creations of divine artificers: tvas.t.r. and r.bhus (RV. I.110.5; X.53.9-10) Vis.n.u prepares the womb and Tvas.t.r. adorns the forms: vis.nuryonim kalpayatu tvas.t.a_ru_pa_n.i pim.s'atu (RV. X.184.1) svadhiti is used to create a well-made form (tvas.t.reva ru_pam sukr.tam svadhityaina_:AV. XII.3.33) Atharva Veda refers to the use of va_s'i_ by taks.an: yat tva_ s'ikvah para_vadi_t taks.a_hastena va_sya_ (AV.X.6.3) RV I.32.5 alludes that Indra strikes Vr.ttra with vajra, as the kulis'a (=axe) fells a tree-trunk: ahanvr.tramk vr.trataram vyamsamindro vajren.a mahata_vadhena; skandha_msi_va kulis'ena_ vivr.kn.a_

hih s'yata upapr.kpr.thivya_h. A cognate Indian lexeme is: kulha_d.i_ (a metallic blade with a cutting edge and a handle). r.bhu, vibhu, va_ja constitute a trinity; the r.bhus are saudhanvana_h (sons of Sudhanvan). The r.bhus are mortals who attained immortality by dint of their workmanship: marta_sah santo amr.tatvama_nas'uh (RV. I.110.4) Commenting on RV. I. 20.1, Sa_yan.a observes that r.bhus were pious men who through penance obtained deification: manus.yah santastapasa_ devatvam pra_ptah. Aitareya Bra_hman.a describes them as men who by austerity (tapas) obtained a right to partake of soma among gods (AB. III.30.2) ya_bhih s'aci_bhis'camasa_m apis'ata yaya_dhiya_ ga_marin.i_ta carman.ah; yena hari_manasa_ nirataks.ata tena devatvamr.bhavah sama_nas'a (RV. III.60.2): With those faculties by which you have fashioned the drinking bowl; with what intelligence wherewith you have covered the (dead) cow with skin, -- with what will by which you have fabricated two horses (of Indra); with those (means) r.bhus, you have attained divinity. Macdonell derives the term r.bhu from the root rabh, to grasp and explains it as handy or dexterous and identifies it with German elbe and English elf. (opcit., p. 133)

tvās.t.r., soma

Tvas.t.r. is the master of all forms and shaper of all animals (tvās.t.a_ ru_pa_n.i hi prabhuh pas'u_nvis'va_ntsama_naje)(RV I.188.9) He is the fashioner of the quick-moving horse: tvās.t.urva_ja_yata a_s'uras'vah (TS. V.I.11.3; KS. XLVI.2) The lexeme also means a fashioner or artificer (A.A.Macdonell, Vedic Mythology, p.117) Indra drinks soma in the house of Tvas.t.r. : tvās.t.ugr.hi apibat somamindrah (RV. IV.18.3) Tvas.t.r. is referred to as supa_n.im, beautiful-handed; sugabhastim beautiful armed and r.bhvam shining or glorious (RV. VI.49.9) sukr.tsupa_n.ih svavau r.ta_va_ devastva.s.t.a_vase ta_ni no dha_t (RV. III.54.12): May the divine Tvas.t.r., the able artificer, the dexterous handed, the possessor of wealth, the observer of

truth,bestow upon us those things (which are necessary) for our preservation. ugrastura_va_lamibhu_tyoja_yatha_vas'am tanvamcakra evah; tvās.t.a_ramindro janus.a_bhibhu_ya_manus.ya_somamapibaccamu_s.u (RV. III.48.4): fierce, rapid in assault, of overpowering strength, he made his form obedient to his will; having overcome Tvas.t.r by his innate (vigour), and carried off the soma, he drank it (or deposited) in the ladles. These and other references lead Macdonell to surmise that Indra's father whom he slays in order to obtain the soma, is Tvas.t.r. (opcit., p. 57) [cf. Chaturvedi, P.S., 1969, *Technology in Vedic Literature*, Delhi, Books and Books].

Soma

On the banks of River Sarasvati, R.gvedic people were engaged in processing **soma**. An entire book is devoted to this 'early chemical' or 'alchemical' process, elaborated through a series of complex metaphors.

r.s.ibhih sambhr.tam rasam (RV 9.67.31): 'liquefied (Soma) or essence of (Veda)' collected by the sages: [see use of -bhr.ta in: s'ulvabhr.ta, that is his purificatory spit-bath'; bhr.ta in sam.bhr.ta = one whose body is well-nourished or fed (TBr.); the usage in metallurgy is in reference to the accumulation of requisite materials]

यः पवमानिर् अध्येत्य ऋषिभिः सम्भृतं रसम् ।

सर्वं स पूतम् अश्नाति स्वदितम् मातरिश्चना ॥

9.067.31 He who reads the hymns to Pavama_na, the essence (of the Veda) collected by the r.s.is, enjoys all (his food) purified, sweetened by Ma_taris'van.[Ma_taris'van = Va_yu, because it breathes in the atmosphere, **antariks.e s'vasiti**; the food is sweetened and purified by the purifying wind].

It is possible that the term sambhr.tam is a pun on the following substratum lexemes connoting 'gold': **samr.obica**, stones containing gold (Mundari.lex.) cf. *soma* (R.gveda) **samanom** = an obsolete name for gold (Santali).

Soma cannot be a plant

Soma is a product, it was traded in Vedic times and offered to the gods. RV 3.35.9,10: 'with the tongue of the fire, drink Soma, O Indra'; Soma was a_tma_ yajn~asya, 'the soul of the sacrifice, the Vedic ritual' (RV 9.2.10;6,8).

RV 10.85.3-4 [somam manyate papiva_n yat sampim.s.anty os.adhim somam yam brahma_n.o vidurna tasya_s'na_ti kas'cana RV 10.85.3 (AV 14.1.3): he thinks that he has

drunk Soma when they grind the herbs together; of the soma which the Bra_hman.as know, none whatsoever partakes] distinguishes between the Soma that the priests know and that which they process.

Niruktam 11.4 explains the r.ca-s: 'The hemistich, 'because they grind the herbs together,one thinks that he has drunk the soma', refers to the uselessly-pressed soma, which is not soma at all. Of the soma which the Bra_hman.as know, none whatsoever,i.e. no one who doesnot offer sacrifice, can partake. This is with reference to sacrifice. Now with reference to the deity. The hemistich,'because they grind the herbs together, one thinks that he has drunk the soma', refers to the soma pressed with the Yajus formula, which is not soma at all. Of the soma which the Bra_hman.as know, i.e. the moon, none whatsoever, i.e. no one who is not a god, can partake.'

Thus, the haoma (or soma) processed in the Avestan tradition is not soma at all; it is a useless herbal substitute. Niruktam 11.4 explains that soma is a metaphor and equates it to the moon.

It will be hypothesized and further elaborated that soma which the early *r.s.i-s* and *kavi-s* (smiths) of the R.gveda knew was electrum – gold-silver compound ore.

The real soma is wealth: RV 9.86.45 **agregora_ja_pyas tavis.yate vima_no ahna_m bhuvanes.v arpitah harir ghr.tasnuh sudr.s'iko arn.avah jyoti_rathah pavate ra_ya okyah**, 'walking in the forefront, the king of the waters becomes strong; as the one who regulates the days, he is installed in the worlds. Golden, butter-backed, beautiful to look at, billowing, riding on a chariot of light, the friend of the house purifies himself to become the wealth for us.' RV 9.106.9: **a_nah suta_sa indavah puna_na_dha_vata_rayim vr.s.t.i_dya_vo ri_tya_pah svarvidah**, 'O pressed drops, wash forth riches to us, purifying

yourself. Let the sky rain, let the waters flow. You find the light.'

If soma/haoma is a derived noun from the verb root su-/sau- (hu-/hau-), 'to press or extract (essence from something), Soma/Haoma cannot be the name of a plant, but only the extract derived from the yajn~a, a process of pressing or liquefaction.

It is a tough philological task indeed to differentiate between the metaphor or allegory, and the process of 'purifying' terrestrial and celestial Soma in the R.gveda.(RV 10.116.3: mamattu tva_ divya_h soma indra mamattu yah su_yate pa_thives.u, 'let the celestial Soma intoxicate you, Indra, let that intoxicate you which men press').

Vis'varu_pa

S'Br 1.6.3.1 ff. has a legend (cf. Hillebrandt, opcit., II, p.240ff.):

"Tvas.t.r. had a son with three heads and six eyes. This one had three mouths. Because he was shaped thus his name was 'All-shaped' (vis'varu_pa). One mouth served for drinking the Soma, one for drinking the Sura_ and the third for other kinds of food. Indra hated him and cut off his heads. From the one with which he drank the Soma a hazel-cock sprang forth; that is why it is reddish brown, for King Soma is reddish brown. From that with which he drank the Sura_, a sparrow emerged. Hence it speaks like a besotted person because one who has drunk the Sura_ speaks like a besotted one. From that which served him for other kinds of food a partridge arose. Hence it is entirely variegated in colour. Tvas.t.r. was furious. 'Has he then really killed my son?' He brought the Soma without Indra. Just as this Soma was pressed (without Indra) so it remained without Indra." The legend goes on to state that Indra seized the Soma by force and vomitted it as a punishment for this (RV 5.5.4.2). Tvas.t.r. denotes his son in three passages of the R.gveda: RV 10.8.8 (tris'i_rs.an saptaras'mi --

seven-tongued),10.76.3 and 2.11.19. Nara_s'am.sa is also called tris'i_rs.an and s.ad.aks.a in MS 4.13.8: devo nara_s'am.sas tris'i_rs.a_ s.ad.aks.ah s'atam id enam s'itipr.s.t.ha_a_dadhati. TS 2.5.1.1 ff. notes that Vis'varu_pa is the Purohita of the gods: vis'varu_po vai tva_s.t.rah purohito deva_na_m a_sit svasriyo sura_n.a_m. By killing Vis'varu_pa, Indra becomes guilty of brahmin-slaughter.

sura = black salt (Skt.lex.)

[Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, II, pp. 2-47].

Asuras: Varun.a, Mithra, and Vis'varu_pa

We have noted that an asura Namuci connoted 'white lead'.

Varun.a pragraha_sa: release from the fetters of Varun.a

TBr I.7.2.6 declares: 'When the law is violated Varun.a seizes'. (He is dharmapati and satyadharman: (TS I.8.10.1; TBr I.7.10.3). A_pS'S XIII.19.1-14 describes the process of the sacrificial bath: "1.He lets the rites of the concluding bath take place. 2.He prepares the bundle of Veda, encloses the fires (with grass) and begins the rite with the washing of his hands. Arrangement of the vessels according to the need...[Note the use of the term, Veda, connoting grass; this could as well indicate the etymology of the word Veda for the yajn~a; a platform strewn with Veda, grass]...4. He prepares the a_jyas that have been taken four times and also the Varun.a-Purod.a_s'a and deposits them (silently) on the northern am.s'a...7.With the verse (RV 1.24.14) 'we deprecate your anger, O Varun.a, with obeisances, with sacrifices and with the offerings of the havis...', the sacrificer throws the black skin away into the pit. [Note the association of the black skin with

Varun.a]...The Su_tra continues further in XIII.2.5: "With the formula 'from the darkness we look upward to the higher light,' they worship the sun; with 'Varun.a's fetter si warded off' they push back the water on the bank (with their feet). (cf. A_pS'S VIII.8.18)...

TBr III.9.3.15 describes the physical characteristics of Varun.a: varun.o vai jumbakah antata eva varun.a avayajate khalater viklidhasya s'uklasya pin:ga_ks.asya mu_rdhan~ juhoti etad vai varun.asya ru_pam ru_pen.aiva varun.am avayajate (cf. S'Br XIII.3.6.5; TA_r I.2.3). Varun.a is a bald-headed, leprous, yellow-eyed man. (vikli_dha = leprous or dantura, 'with oversize teeth; S'S'S also adds the attributes: khan.d.a, cripple and ban.d.a, impotent). He is also hiran.yas'r.n:ga, i.e., gold-horned (TA_r X.1.47: hiran.yas'r.n:gam varun.am prapadye ti_rtham me dehi_ya_citah).

Like Soma, Varun.a is purchased (S'S'S) for sahasren.a gava_m, thousand bulls/cows.

TS VI.1.11.1 notes: va_run.o vai kri_tah soma upanaddha; and TS VI.1.11.5,6 adds: varun.o va_es.a yajama_nam abhyati yat kri_tah soma upanaddhah. S'Br. III.3.4.25 cites a customs invoked in the Su_tras: sa yad a_ha varun.asya skambhasarjani_stha iti varun.yo hy es.a etarhi_bhavati yat somah kri_tah.(cf. MS III.7.8). The recurring theme is: kri_tah somah, the 'purchased Soma'.

The invoking of Varun.a is related to the release of the fetters of Varun.a: MS I.10.10 (150.10): yad varun.apragha_sair yajeta sarvya_mhaso ves.t.yai. (cf. S'Br. II.5.2.4: varun.apa_s'a_t pramun~cati ta_asya_nami_va_akilbis.a_h praja_h praja_yante tasma_d va_es.a etais' caturthe ma_si yajate; A_pS'S VIII.7.26 states: 'they step on the edge of the water with the formula, 'Varun.a's fetter is trampled'.)

A_pS'S specifies the rites after the conclusion (X.20.12-27) of the buying of the Soma.

Tying Varun.a's fetter

A_pS'S X.27.9 " 'You are Aditi's seat,' with this mantra the Adhvaryu spreads inside the cart a black skin with its neck to the east and the hair upwards and deposits the King (Soma) upon it with the words, 'be seated on Aditi's seat', wraps him in a cloth while saying, '[Varun.a] has spread the atmosphere in the trees' and ties a black skin in the front [at the door] with its neck upwards and the inner side to the outside, reciting thereby the verse addressed to the sun, 'they lead Ja_tavedas upwards'.

X.28.1: 'Now he touches the ends of the yoke as is done in the sacrifice to the new and full moon, lifts the cart up with the mantra, 'you belong to Varun.a,' props it with the words, 'may Varun.a prop you', fixes the yoke-pin with 'you are the prop of Varun.a', drives the draught animals towards [the cart] with the words, 'advance, you red ones who bear the yoke', puts the strap around saying 'you belong to Varun.a' and ties the halter (abhidha_ni_) with 'Varun.a's fetter is tied'.

2."Similarly he harnesses the ox on the north side.

3."Holding two green branches, the Subrahman.ya crawls between the poles: these are Pala_s'a or S'ami_branches.

4."Now the Adhvaryu holds the cart and gives the order: 'for King Soma who has been bought and who is being carried forward recite, O Subrahman.ya, invoke the Subrahman.ya_."

The procession moves towards the vedi, while the Adhvaryus carry a chair made in a specific form (royal throne?) out of Udumbara wood.

A_pS'S X.29.9: "[After the arrival] he stops the cart in front of the Pra_gvam.s'a, the pole being towards the east or north, lifts [the cart] up in the same way as before, props it up, pulls out the yoke-pin with 'you are the prop of Varun.a', unties the strap with 'Varun.a's fetter is untied', removes the halter with 'Varun.a's fetter is removed'.

A_pS'S X.30.15: "he removes the cloth with the words, 'you belong to Varun.a, holds the King with the mantra, 'you are Varun.a who protects the ordinances,' takes him down while reciting the verse: 'Come down with uncurtailed wings to the subjects, longingly to the longing ones,

amiably to the amiable, O king Soma' etc., and moves forward saying 'go along the wide atmosphere'.

X.31.1: "Carrying the throne, the Pratiprastha_tr. goes in front.

2. "With the verse 'your abodes' (RV 1.91.4) he enters the Pra_gvam.s'a through the eastern door, takes the throne behind the A_havani_ya towards the south while reciting 'you are the true seat of Varun.a', and installs it to the south of the A_havani_ya.

3. "He spreads a black skin on the throne just as it was spread earlier in the cart, and deposits the King upon it.

4. "You are Varun.a who protects the ordinances"--thus he greets the king.

5: "You belong to Varun.a.' With this mantra (addressed to the cloth) he wraps him in the cloth.

6. "Salute thus the mighty Varun.a, the wise guardian of amr.ta. May he grant threelfold protection. O Heaven and Earth, protect me in your lap (TBr. II.5.8.4). He should approach the King always with this verse.

7." 'Do not walk between Agni and the King'. Thus he directs."

When Soma is brought to the Veda (after the pran.ayana, A_pS'S XI.17.10), a black skin is spread inside the southern cart in the same way as it is spread upon the throne and earlier in the cart, and the Soma is deposited upon this skin.

The role of the divinity, Varun.a emerges from these practices: Varun.a is the black skin and cloth in which Soma is wrapped, i.e. upanaddhasya somasya varun.o devata_.

TS 5.5.4; TBr 1.1.3.8; 2.1.4 narrate a legend. Agni stealthily moves upto the waters, the wives of Varun.a, to unite with them. His seed flowed forth and became gold.

A comparable procedure of wrapping-up is indicated in the rite of piling up Agni. The soil required for the ukha_ is wrapped up in a lotus leaf and black skin and the bundle is tied up with a string. (A_pS'S 16.3.4,7; S'Br 6.4.3.8). TS 5.1.5.3 notes: varun.o va_ agnir upanaddhah. Agni will be later kindled in the ukha_ through self-ignition. Soma and Agni are within Varun.a's fetters.

RV 10.124.5: nirma_ya_ u tye asura_ abhu_ van
tvam ca ma_ varun.a ka_maya_se r.tena ra_jann
anr.tam vivin~can mama
ra_s.t.rasya_dhipatyam e_hi

'The Asuras have become powerless, and you, O Varun.a, may favour me. Discerning between the right and wrong, O king, come for the overlordship of my kingdom.' Following this desire of Indra to win over Varun.a, the next verse tries to invite Soma. The reference to the Asuras may be to the pitr. asura or Father Asura. Varun.a is the son of Asura in RV 5.85.5; Agni is garbha a_surah (RV 3.29.11). Note that in the Avestan tradition, Mazda is the father of fire; puthro_ ahurahe mazda.

The 'wrapped-up Soma' in the black-skin/cloth and placed on the Veda, is Varun.a. Varun.a has 'fettered' Soma and the release of the fetters, releases Soma, the waters.

Maitra_varun.au

इन्द्रवरुणा यद् इमानि चक्रथुर्विश्वा जातानि भुवनस्य

मज्मना ।

क्षमेण मित्रो वरुणं दुवस्यति मरुद्भिर् उग्रः शुभम्

अन्य ईयते ॥

7.082.05 Indra and Varun.a, inasmuch as you have created by your might all these beings of the world, therefore Mitra worships Varun.a for prosperity, while the other, the fierce Indra, associated with the Maruts, acquires glory. [Therefore Mitra worships Varun.a: ks.emen.a mitro varun.am duvasyati marudbhir ugrah s'ubham

anya i_yate: the last clause: along with the Maruts the powerful Indra sends down rain].

The meaning of the term, 'mitra', as 'friend' may be a later development. (Eggers, 1894, *Der arische Gott Mitra*, Dorpat). Some attempt a derivation, *metlo = gmathi_, place of assembly or market; or, originally, coming together, appointment. (See note. 189, I, p. 303, Hillebrandt, opcit.)

"For Mitra a vessel is carved out of an As'vattha branch which grew towards the east or north and which fell off by itself. The vessel is placed upon the one meant for Br.haspati. Large undamaged grains of rice are chosen for the portion of caru meant for Mitra; small cast-off grains for Br.haspati. Fresh butter is produced in the following manner: one drives round and round on a war-chariot with a leather pouch filled with milk and thus lets the butter form by itself. [note 195, p. 304: This is a primitive method of extracting butter. Significant here is the 'self-originating' of the butter, 'self-breaking' of the twig; this obviously symbolizes Mitra svayambhu_). This butter is thrown into the upper vessel, and also the large grains which will then be cooked there...injunctions given by TS I.8.9.2 for this sacrifice: 'in the milk of a white cow with white calf (for Br.haspati), in the butter that curdled and formed into butter by itself (for Mitra); in a vessel with four corners made of As'vattha wood from a branch that has fallen off by itself. He should sort the husked and unhusked grains (karn.a and akarn.a, i.e., khand.ita and akhand.ita). The husked ones in milk are for Br.haspati, the unhusked in butter are for Mitra. The vedi is self-made (svayamkr.ta_, i.e., not artificially constructed), the barhis consists of grass that is self-cut (svayamdina), the fire wood is from branches that have fallen to the ground by themselves (svayamkr.ta), the above-mentioned cow with white calf is the daks.in.a_" (cf. TS V.6.11: maitra_ba_rhaspatya_ dhu_mralala_ma_s tu_para_h). [Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, II, p34].

The dual form is a contrast between Mitra and Varun.a, though complementary to each other, like the contrast between white and black, day and night. Varun.a is an asura; Varun.a and Mitra are called asura_ (RV 1.151.4; 7.36.2; 7.65.2; deva_na_m asura_ in RV 8.25.4); they are called asurya_ (RV 5.66.2; 7.65.1; 66.2; 8.25.3). The two asuras find a parallel in the

Avestan Ahura-Mithra. Mithra is mentioned with Auramazda_ and Anahata in old-Persian cuneiform inscriptions. (Spiegel, *Die altpersischen Keilinschriften*, 2nd ed., p. 68). In Armenia, there was a shrine dedicated to him. (Gelzer, 'Zur armenischen Gotterlehre', *Sitzungsberichte der Königl. Sachsischen Gesellschaft der Wissenschaften* -- SBKSGW, XLVIII, 1896, p. 103).

The two divinities, Varun.a and Mitra are offered ghr.ta_huti, ghr.ta_nna, sarpira_suti. They also receive payasya_ (S'Br II.4.4.10 ff.; KS'S VIII.9.27; A_pS'S XI.5.12). S'Br IV.1.4.9 notes: tad yad eva_tara payah tan mitrasya soma eva varun.asya, whatever milk there is belongs to Mitra, but the Soma to Varun.a. According to the Avestan tradition (Yasht X.86), Mithra is the protector of the cow, 'the cow driven astray invokes him for help, longing for its pastures'.

Ya_ska provides an extraordinary etymology linking Mitra and the fat oblations (were they wrapped up in Varun.a?): Nir. 10.21-22: "Mitra is (so called) because he preserves (tra_yate) from destruction (pra-mi_-ti) or because he runs (dravati) measuring things together (root: mi), or the word is derived from the causal of (the verb) mid (to be fat). The following stanza is addressed to him. Proclaiming, Mitra leads men forth, Mitra supported earth and heaven. Ever watchful, Mitra beheld the tribes. To Mitra sacrifice the fat oblations. (RV 3.59.1). Proclaiming, i.e. speaking encouraging words, Mitra leads men; Mitra alone supports earth and heaven. Without winking Mitra beholds the tribes. The word kr.s.t.ayah is a synonym of men, (so called) because they are active, or because their bodies are long (vi-kr.s.t.a). 'To Mitra sacrifice the fat oblations' has been explained. The verb hu means to give.

मित्रो जनान् यातयति ब्रुवाणो मित्रो दाधार पृथिवीम्
उत्तयाम् ।

मित्रः कृष्टीर् अनिमिषाभि चष्टे मित्राय हव्यं घृतवज्रं
जुहोत ॥

3.059.01 Mitra, when praised, animates men to exertion; Indra sustains both the earth and heaven; Mitra looks upon men with unclosing eyes; offer to Mitra the oblations of clarified butter. [Mitra: signifies the sun, who is measured or appreciated (miyate) by all, and who preserves (tra_yate) the world, by bestowing rain; cf. Nirukta. 10.22].

In a series of metaphors employed in the R.gveda, one cluster of metaphors relates to the functions assigned to 'deities or divinities':

Nature and Functions (karma) of 'deities'

The allegorical nature of the Vedic literature becomes apparent when we define the nature and functions of 'deities' extolled through hymns and offered Soma. Soma is not food for mortals but is food for the divinities.

Cha_ndogya Upanis.ad (5.10.4): **es.a somo ra_ja_. tad deva_na_m annam.tam deva_bhaks.yanti** (Soma is king, Soma is food for the divinities; divinities eat Soma).

tisra eva devata_itinairukta_h; agnih pr.thivi_stha_nah; va_yuvendro va_ntariks.astha_nah; su_ryo dyustha_nah; ta_sa_m ma_habha_gya_dekaikasya_api bahu_ni na_madheya_ni bhavanti; api va_karma pr.thaktva_t; yatha_hota_dhvaryurbrahmodga_tetyapyekasya satah; api va_pr.thageva syuh; pr.thugdhi stutayo bhavanti...atha_ka_ra cintanam devata_na_m; purus.avidha_h syurityekam; cetana_vadvaddhi stutayo bhavanti; tatha_bhidha_na_ni; atha_pi paurus.avidhikairan:gaih samstu_yante...yatho etacetana_vadvaddhi stutayo bhavanti_tyacetana_nyapyevamstu_yante; yatha_ks.aprabhr.ti_nyos.adhiparyhanta_ni.

"There are three deities only", say the etymologists: (1) Agni, whose sphere is earth; (2) Va_yu or Indra, whose sphere is atmosphere; (3) the sun, whose sphere is

heaven. Of these, each receives many appellations on account of his supereminence, or the diversity of his function, just as a priest, although he is one, is called the sacrificer (hotr.), the director of the sacrifice (adhvaryu), the possessor of the sacred lore (brahma), and the chanter (udga_tr.). Or else they may be distinct, for their panegyrics as well as their appellations are distinct...Now (we shall discuss) the appearance of the gods. Some say that they are anthropomorphic, for their panegyrics as well as their appellations are like those of sentient beings. Moreover they are praised with reference to anthropomorphic limbs...As to the view that their panegyrics are like those of sentient beings, (we reply) that inanimate objects, beginning from dice and ending with herbs, are likewise praised.' (Niruktam 7.5, 6,7)

Soma is a liquid manifestation of the celestial fire (Hertel, *Die Arische Feuer-Lehre*). RV 9.54.2: ayam su_rya ivopadr.g ayam sara_m.si dha_vati sapta_ parvata a_ divam, 'in appearance like the sun, he runs through the lakes, the seven streams and heaven'. RV 9.54.3: ayam vis'va_ni tis.t.hati puna_no bhuvanopari somo devo na su_ryah, 'Soma stands, purifying himself, above all the worlds, like the god Su_rya'.

It is a metallurgical allegory; Soma is extracted out of the bronze fortress, a fortification of heaven, by the eagle which tore it quickly from the heaven: RV 8.100.8 manojava_ ayamanah a_yasi_m atarat puram divam suparn.o gatva_ya somam vajrin.a abharat; RV 1.93.6: Ma_taris'van fetched one of you (Agni and Soma) from heaven; the eagle twirled the other (Soma) from the cloud-rock. [Note the mountain-dwelling (giris.t.ha_ RV 3.48.2; 5.43.4; 9.18.1; 62.4), mountain-grown (parvata_vr.dh RV 9.46.1) Soma, connected with the rock (adri RV 5.85.2; 1.93.6)].

The early traces of conflicts between the asura and the deva and between Vedic Soma and Avestan Haoma, are seen the dialogue between

Suplan Sa_rn~jaya and Prati_dars'a Aibha_vata, in the context of accepting sura_ in the Sautra_man.i_ (S'Br 12.8.2.3, 7):

Suplan: yat na di_ks.ate na soma_m.s'ava iva nyupyante tha katham sautra_man.i_ somayajn~o bhavati, 'how can then the Sautra_man.i_ be a Soma sacrifice when one neither consecrates himself with di_ks.a_, nor throws down the Soma shoots?'

Prati_dars'a replies: ete khalu va_ etasya yajn~asya soma_m.s'ava ity a_hur yac chas.pa_n.i takma_ni la_ja_ it pra_tahsavanasyaitad ru_pam yac chas.pa_n.i, 'the Soma shoots at this sacrifice are the young blades of grass, fresh sprouts of corn and parched grain. The form of the morning pressing are the young blades of grass'.

Bartholomae quotes from Avesta -- the *Ni_rangista_n*: dahmo_ huram xvaraiti; mado_ aspyapayanho, 'the faithful enjoys the hura_; a Madha out of horse's milk'. (ZDMG, XXXVI, p.459; Geiger, *Ositanische Kultur im Altertum*, p.233; cf. *A_fri_nga_n* 1.4).

Soma and indologists' puerile fancies

"My critics, following their own methods, have come to see 'puerile fancies' or 'formless confusion of images and mystic fantasies' in the 114 hymns of the ninth book with their different authors, supposed or real. But, in reality, the ancient R.s.is did not indulge in any hieratic game. On the contrary, they absorbed an old popular belief, which was lost later on; they preserved it and enlarged it into a ritual. I still adhere to my interpretation and do not see any reason to change anything basically. It appears that for many scholars of Vedic mythology cloud-castles and cloud-demons are still indispensable constituents of the Vedic landscape, although no passage speaks of cloud-castles; in their view the Pan.is are 'misers' and remain so, although a thorough study of all the passages proves them to be a marauding tribe. Research is guided very much by the statements, or by the silence, of the Indian commentaries and does not take into

account the historical development which took place during the millennium before and the one after Christ and which must have taken place in the natural course of events. This applies also to the interpretations of Indra-Vr.tra and Mitra-Varun.a...It is the ritual literature that takes us nearest to the period when the collection of the hymns was made. No doubt, it does not cover all the rites anticipated in the R.gveda; it cannot answer some of our questions; still it remains the source in which the mythological tradition is preserved, relatively speaking, in its purest form. It is surprising, therefore, that works on mythology, while referring to tradition, look for it first of all in the later commentaries and not in the ritual texts or overlook these completely...There is no denying the fact that the names of the gods are derived from appellatives, but they are merely 'derived'...Even if we knew the correct etymology, it would not be of any profit to mythology; for the etymological meaning is too general to say anything significant about the individuality of a god...Why is Pu_s.an called a_ghr.n.i fifteen times, which is translated as 'shining' or 'glowing'? [Geldner also translates ghr.n.i as 'sunshine, blaze of the sun, the sun']. In the absence of such an evidence, the prerequisite for us to accept this common view that Pu_s.an is the lord of the paths also disappears. " [Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, pp.1-7].

A clear differentiation has to be made between the soma described in the R.gveda and the substitute described in the Avestan and later-day Vedic texts.

Vr.tra

Like Namuci, Vr.tra is an ominous figure who has withheld the 'waters' from the world and is engaged in a series of 'battles' with Indra who is called Veretragnha in Avesta; the imageries generated in the r.cas is the success achieved by Indra in finding a path-way for the waters by removing the obstruction or hindrance, which is personified by Vr.tra as well as Vala. Vr.tra as enveloper of the 'waters' is called the paridhi, the enclosure of the rivers (RV3.33.6).

Suffice it to note that a possible etymology for Vr.tra's opponent, Indra, is: indh. (See Grassmann and Bollensen -- ZDMG, XLI, p.505; Bergaigne (II, p.171). Indra is a personification of the flaming embers which constitute the core of the purification process for obtaining Soma. Indra reigns over other divinities, who also have to be interpreted consistent with this allegory of purification through fire, using a variety of materials.

indh (Skt.) inddhe , {indhā_m.-cakre} or {idhe} , {indhis.yate} , {aindhis.t.a}, {indhītum} , to kindle , light , set on fire RV. AV. S'Br. &c. (p.{i_ndh_na} RV. AV.v , 3 , 1 ; xix , 55 , 3 ; 4 , kindling , lighting;{i_dha_na} RV. , kindled , lighted , flaming);Pass. {idhyate} , to be lighted ; to blaze , flame RV. SV. MBh. ; [of. Lat. {oes-tus} , {oes-tas} ; Old. Germ. {eit} , `` fire. ""]

viruttam, obstruction, hindrance (Ta.lex.)

vr.tra (Skt.) m. (only once in TS.) or n. (mostly in pl.) `` coverer , investor , restrainer "" , an enemy , foe , hostile host RV. TS. ; m. N. of the Vedic personification of an imaginary malignant influence or demon of darkness and drought (supposed to take possession of the clouds, causing them to obstruct the clearness of the sky and keep back the waters ; Indra is represented as battling with this evil influence in the pent up clouds poetically pictured as mountains or castles which are shattered by his thunderbolt and made to open their receptacles [cf. esp. RV. i , 31] ; as a Da1nava , Vr2itra is a son of Tvasht.r.i , or of Danu q.v. , and is often identified with Ahi , the serpent of the sky , and associated with other evil spirits , such as S.us.n.a , Namuci , Pipru , S3ambara , Uran.a , whose malignant influences are generally exercised in producing darkness or drought) RV. &c. &c. ; a thunder-cloud RV. iv , 10 , 5 (cf. Naigh. i , 10) ; darkness L. ; a wheel L. ; a mountain L. ;N. of a partic. mountain L. ; a stone Ka_tyS'r; N. of Indra(?) L. ; n. wealth (= % {dhana}) L. (v.l. % {vitta}) ; sound , noise L.

In Vr.tra, Darmesteter notes the concordance between Avestan verethra and Vedic Vr.tra, the latter an ancient name of the cloud which encloses the light or the cows and defines Vr.tra as 'the enveloper who shuts them (thelight and the waters) up in his cloud-cavern' (*Ormazd et Ahriman*, pp.97, 367). In RV 3.33.6, he is called the paridhi, the enclosure of the rivers. Vr.tra has a mysterious hiding-place (nin.ya) from which the waters are delivered by Indra, after splitting the bosom of the mountains (parvata). [Note the reference to mountains or forts or fortified dwellings and caves, an apparent reference to the mountains from which the Soma ore is collected]. Referring to RV 1.32.2,11, Hopkins notes: "for the oft-mentioned act of cleaving the cave, where the dragon Vala or Vr.tra (the restrainer or enveloper) had coralled the kine (i.e. without metaphor, for the act of freeing the clouds and letting loose the rain)" (*The Religions of India*, p. 20,n.3)

Vr.tra hides the cows and rays of the morning in his stable. Sarama_ discovers the dark stables of Vr.tra and the Pan.is. (Max Mueller, *Chips from a German Workshop*, 2nd. ed., IV,pp. 249 and w253). Indra is gotrabhid, the liberator of the red cows, the Us.as from the stable.

Vr.tra besieges the waters in the mountains, the parvata or the rock-fortress, reminiscent of the cold winters in Kashmir mountains considering that the R.gveda names many rivers which flow from the Himalayas, the snow-clad mountains, to the north-west. RV 8.32.26 notes that Indra slays Arbuda in winter; TBr 3.12.7.2 notes:himo yas' ca s'i_yate.

RV 8.32.26: **ahan vr.tram r.ci.s.ama aurn.ava_bham ahi_s'uvam himena_vidhyad arbudam**

Sa_yan.a explains Arbuda as a cloud; an alternative view is that the term denotes 'winter's cold' which becomes Indra's weapon. Does himena represent only a specific time?

The straightforward inference is that the verse alludes to the Himalayas and the Arbuda mountains as metaphors related to Vr.tra's enclosing the 'waters' or the 'cows', i.e. the riches which Soma, the crushed ore block, holds.

The obstructive nature of Vr.tra is noted from the terms used to describe Vr.tra's actions: gras, ba_dh, rudh, vr., stabh, stha_ and s'i_. He encloses, shackles and obstructs the terrestrial streams and mountains. These are pierced by Indra's vajra, a golden disc made out of the heat which once resided in Praja_pati and now resided in Indra, a disc which was tied to Indra. (TBr 2.2.10.1). Vr.tra is associated with mi_h, hail: The battle against Indra results in Vr.tra spreading fog and hail all around. (RV 1.32.13; 2.30.3; 10.73.5).

TS 6.5.9.1: indro vr.tram ahan tasya s'i_rs.akapa_lam ud aubjat sa dron.akalas'o bhavat tasma_t somah sam asravat sa ha_riyojano bhavat (MS 4.7.4 (97.18)).

Vr.tra's skull becomes the dron.akalas'a vessel and the Soma flowing out of the vessel becomes the ha_riyojanagraha. Another passage (TS 6.1.1.5; MS 3.6.3 (62.9); S'Br 3.1.3.12) notes that Vr.tra's eyeball fell away and became collyrium (an~janam) [Note. This is the saga of the removal of 'antimony' from the quartz, Soma pyrites!]. The lotus garlands symbolises the limbs of Vr.tra which the yajama_na wears. (MS 4.4.7 (58.16 ff.)). After Indra has killed Vr.tra, the enemies (mr.dh, an apparent reference to the soft metals such as lead) rush at Indra (TS 2.5.3.1). The cementation of lead with the bones in a cupel are reminisced in the legend related to Dadhi_ca (MBh 3.100). The bones of Dadhi_ca are used to make Indra's vajra; the r.s.i's hermitage was situated on the banks of the River Sarasvati_. Tvas.t.r. makes the vajra from these bones. When the vajra is hurled, 'the great Asura who is adorned with a golden wreath', i.e. Vr.tra sinks. [Note the association with the lotus garland].

Vala

Vala is called gomat -- rich in cattle, consisting of cattle (RV 1.11.5) and is a cave. (dr. RV 1.62.4; 10.138.1; bhid RV 1.52.5; 2.11.20; 15.8; 24.3; 3.34.10; 8.14.7; 10.62.2; ruj RV 3.45.2; 4.50.5; vr.+apa RV 1.11.5; 2.14.3; arva_k-mud RV 8.14.8). Other expressions used: valasya bila (RV 1.11.5; apadhi (RV 2.12.3); paridhi (RV 1.52.5: ?wall); sa_nu (RV 6.39.2) Vala is also associated with a set of complex words: ala_tr.n.a (miserly), jasu (hiding-place), phaliga, govapus. [phaliga (Padap. %{-li-ga4}) m. (prob.) a cask or leather-bag or anything to hold fluids (applied to clouds or water-receptacles in mountains) RV. (Skt.lex.)] "In RV 8.24.30 gomati_ is conspicuous in its association with Vala. In RV 1.11.5 Vala is called gomat; in 8.6.23 gomati_ is an epithet of pur. However, I would like to believe, as Sa_yan.a does, that in 8.24.30, gomati_ refers to the river Gomati, on the banks of which Vala would thus belocated." (Hillebrandt, opcit., II, p. 153).

त्वं वलस्य गोमतो ऽपावर् अद्रिवो बिलम् ।

त्वां देवा अविभ्युषस् तुज्यमानास आविषुः ॥

1.011.05 Your, wielder of the thunderbolt, did open the cave of Vala, who had there concealed the cattle; and the gods whom he had oppressed, no longer feared when they had obtained you (for their ally). [Vala was an asura; he stole the cows of the gods and hid them in a cave; Indra recovered the cattle after surrounding the cave with his army. Pan.is, also cow-stealers, were the soldiers of Vala (Anukraman.ika_)].

यत् त्वा पृच्छाद् ईजानः कुह्या कुह्याकृते ।

एषो अपश्रितो वलो गौमतीम् अव तिष्ठति ॥

8.024.30 If any ask of you, (Us.as), when anywhere present, where the sacrificer (Varu dwells), (reply) the powerful (prince), the refuge of all, abides on (the banks of) the Gomati_ river. [Ask of you: kuhya_kr.te = oh, you who are honoured by those who ask where Varu wells, sa varuh kutra tis.t.hattyetad icchaya_bhilaks.an.a pravrttair jijñ~a_subhih

puraskr.te (us.as); valah = varah, svabalena
ava_rakah s'atru_n.a_m, overwheeler of
enemies].

While Sa_yan.a notes the reference in RV
8.24.30 to be River Gomati_, it is unclear if the
reference of the river is indeed to Gomati_ in
Afghanistan (as surmised by Hillebrandt); it
could as well refer to Gomati_ near Allahabad
in northern India. There is, however, in RV
10.75.6, a reference to a Gomati_ river flowing
in the River Sindhu, together with Tr.s.ta_ma_,
Susartu, Rasa_, S'veti, Kubha and Mehatnu.

तृष्टमया प्रथमं यातवे स्रजः सुसर्त्वा रसया श्वेत्या

त्या ।

त्वं सिन्धो कुभया गोमती कुमुम् मेहन्त्वा सरं याभिर्
ईयसे ॥

10.075.06 You, Sindhu, in order to reach the
swift-moving Gomati_, have united, yourself
first with the Tr.s.ta_ma_; (now be united) with
the Susartu, the Rasa_, the S'vetya, the Kubha,
and the Mehatnu, in conjunction with which
streams you do advance. [In conjunction with:
saratham = lit. having mounted the same chariot
with them]. A reference to Kubha_ (Kabul
river), conjointly with Rasa_, Anitabha_ and
Sarayu also occurs in RV 5.053.09 Let not the
Rasa_, the Anitabha_, the Kubha_, or the wide-
roving ocean delay you; let not the watery
Sarayu oppose you; may the happiness of your
(approach) be ours. [Rasa, Anitabha_, Kubha_:
names of rivers; the wide-roving ocean: kramuh
sindhuh = sarvatra kraman.ah samudra, the
every-where going ocean]. Sarayu_ f. N. of a
well-known river (commonly called Surjoo ; on
which stood the ancient city Ayodhya1 [cf. R. i
, 5 ; 6] ; it is a tributary of the Gogra [see
% {gharghara}], and in RV. is mentioned along
with the rivers Sarasvati1 , Sindhu , Gan3gal ,
Yamuna1 , and S3utudri). [1182,2] Rasa_ a
mythical stream supposed to flow round the
earth and the atmosphere ib. (Nir. xi , 23)

An:giras participates in the acts against the cave
of Vala (RV 1.62.4;2.11.20; 15.8; RV 6.39.2;
10.62.2; cf. also RV 10.67,68). RV 10.67,68

note amidst the mythology that Vala as a
demon who has cows in his possession and is
described as govapus. (RV 10.68.9). Vala is a
Pan.i (RV 10.67.6; cf. RV 6.39.2). It is notable
that the RV 10.67,68 are ascribed to Aya_sya
a_n:girasa. [Note the incorporation of ayas,
metal or copper in the attribute of the name].

Gods help Indra in overcoming Vala to release
the cows (go) and open the stable (RV 1.11.5).
Cows are interpreted as 'rain-clouds' shut in the
rock by Vr.tra. A basis for the metaphor can be
that the 'go' represents 'wealth' represented by
Soma, electrum. The setting-free of the cows
represents the return of the light, the red cows
of the Us.as. (Note: *ausom-, gold). Sa_yan.a
explains Vala as a cloud, as an Asura connected
with parvata (RV 10.68.5,9); Ya_ska 6.2 and
Mahi_dhara 20.68 also equate Vala with
megha.

Could Vala connote the 'phaliga', a leather-bag
holding some essence of cow, **go-vapus**.?

Soma: a_tma_yajn~asya

This pithy R.gvedic statement means that soma
is the very soul of yajn~a, that is, the key
purpose of performing the yajn~a is to process
soma.

Soma, a drink for the deva-s

Soma is a drink not for the mortals but for
Indra: somam indra_ya pa_tave (RV 8.69.10);
indur indra_ya pavatta iti deva_so abruvan,
'Gods themselves were witness when Indu
purified himself for Indra'.

A_pS'S 10.20.12: 'He should buy king Soma
from the son of a Kutsa or from any other
brahmin. Also from a non-brahmin...

15: 'Soma seller, cleanse the Soma', he says and
turns away. (A_gni_dhri_ya takes Adhvaryu's
place in KS'S 7.6.16).

17: 'Neither his servant, nor the Adhvaryu, nor a servant of the Adhvaryu should watch this'.

Offerings like Praya_n.i_ya_is.t.i follow.

10.22.2: 'the cow -- one-year old, or two-years-old, or older-- meant as the price for Soma stands from east to west'.

10: 'May Pu_s.an protect you from the path', as the cow moves forward.

23.1: 'During the seventh step he whispers: 'We became friends through the seven steps. I may gain your friendship'.

2: With the words, 'may Br.haspati please you with favour', the Adhvaryu puts his hands around the seventh footprint, places a piece of gold on it, and makes an offering on this with the words: 'on the head of the earth (on the sacrificial place etc.) I besprinkle you'. Then he takes away the gold and catches hold of sphya (wooden sword) with the words: 'by the order of the god Savitr.' etc. He draws a circle three times around the footprint from left to right as far as the butter has spread and utters: 'The evil spirit is enclosed in a circle, enclosed are the ara_tis.'

3: 'With the horn of a black antelope he traces gently over the circle, digs out the soil as far as the butter has spread, and puts it in a pot with the words: 'wealth is with us'. Then he gives the pot to the sacrificer with the word: 'wealth is with you'.

4: 'Then he gives it to the wife of the sacrificer with the word: 'yours is the wealth'.

6: 'He makes the Soma cow look at the wife, during which he utters: 'look at yourself with the divine Urvas'i_.

9-10: 'At the place where the footprint is dug out he washes his hands, which hold the gold, and pours the water with the mantra: 'Tear up the soil and split the celestial cloud. Give us from the celestial water. Being the lord, open up the tube.' He breaks the (soil of the) footprint into three parts, scatters one part to the north of the Ga_rhapatya, another part to the A_havani_ya into the cold ashes, and gives the third part to the wife who places it in her dwelling.

24.2: '(Adhvaryu, Brahman and the sacrificer) go with a cart which is curtained off all around, covered on the top and from which the front plant is removed, towards the east to Soma. During which they utter the mantra: 'we walked on this path which leads to happiness' etc. (RV 6.51.16).

3: 'If the place is on a mountain, then they carry Soma on the head after purchasing it. (Thus they do not need a cart).

5: 'The sacrificer says to king Soma: 'May your young shoot unite with the young shoot' etc.

7: 'The Adhvaryu places upon the skin a linen garment, folded twice or thrice, with its seam directed towards the east, or upward, or towards the north.

8: 'On this he holds the am.s'us with his fingers -- with the gold in the fingers and without bending the thumb and the little finger -- and measures with the Aticchandasa verse: 'I praise the god Savitr., the wise' etc. [Note: The measurement is apparently a linear measurement of the length and thickness of the electrum streaks in Soma, the ore block].

9: 'In the same way he measures, each time with the (next) finger, leaving (the previous one).

10: 'In all (measurements) he uses the thumb.'

This is followed by different rules about measuring Soma...This done, he steps forward to buy Soma.

25.1: 'God Su_rya, we want to buy Soma. We proclaim him to you; you (proclaim) him to all gods. Prepare the sacrifices, prepare the remunerations for the sacrifice according to the season and deity'. With this he worships the sun, gives king Soma (which is tied) to the Soma seller and bargains.

2: 'Soma seller, will you sell king Soma?'

3: 'The latter replies: 'I will sell it'.

4: After having said: 'from you I buy Soma, juicy and rich in milk', he tells him: 'I want to buy it from you for one-sixteenth (of the cow).' [MS 3.84.13: somam te kri_n.a_ni maha_ntam bahvarham bahu s'obhama_nam kalaya_ te kri_n.a_ni... Baudha_yana notes the question: is the Soma from the mountain Mu_javat).

5: 'The Soma seller replies at each bargain till the end: 'King Soma is worth more than that'.

6: At the second time he says: 'I want to buy it from you for a kus.t.ha_'; at the third time: 'I want to buy it from you for the hoof (1/8)'; and at the fourth time: 'I want to buy it from you for the foot (1/4)'. (KS'S 7.8.10 steps up the bargain as: s'apha, pada, ardha, go).

7: 'This is repeated thrice.

8: 'Or each of these thrice.

9: 'At the end he says: 'I want to buy it from you for the cow'.

11: 'Having whispered: 'I buy your lustre with lustre' etc., he buys for gold.

12: 'Having whispered: 'you are a body of heat' etc., he buys for a goat. (He buys) one for each of the rest. (i.e. young cow, bull, a pair of calves and garment).

26.10: 'With the words: 'let the gold be with us', he takes away the gold from the Soma seller.

11: 'He gives a bundle of white wool to the sacrificer with the word: 'let the light be among us'. This he makes into the na_bhi_ of the woollen strainer at his own time.

12: 'The white woollen strainer is woven at home with the threads from the wool of a white sheep.

14: 'He moistens a bundle of black wool with water, twists it with words: 'here I twist the necks of the biting snakes', and throws it at the Soma seller, saying: 'may darkness dwell in the Soma seller'.

15: 'O sva_na! bhra_ja! (?) An:gha_ri! bambha_ri! hasta! suhasta! kr.s'a_nu! These are the prices for you. Guard them. May you not be cheated'. With this he points to the prices and takes away the king Soma from the Soma seller with the mantra: 'You are created from your own self. You exist through your own self. You are created for this task. I take you according to merit. You protect me according to merit.' [Kr.s'a_nu, the archer, shoots the Soma bird: RV 4.27.3; 9.77.2; ABr. 3.26].

16: 'Should the Soma seller give trouble, then he should snatch Soma from him.

27.1: 'The sacrificer uncovers (the shoulder and head) with the verse: 'feathred birds' etc. (RV 10.73.11).

2: 'He gives the staff used during the consecration of Soma to the Maitra_varun.a.

3: 'The sacrificer takes Soma with the mantra: 'Mitra, come to us'; he places it on his right thigh, saying: 'enter Indra's thigh', and presses it down constantly with the hands.

6: 'Should the Soma seller object, then one should strike him with a spotted leather strap and drive him away.

7: 'Some hold that he should be beaten with a log of wood.

8: 'Some hold that beating must take place."

Thus ends the buying of Soma.

[Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, p160-165].

"If Soma was really a precious possession, as the singers praise it, then it was hardly likely that it was a *publici juris*, and its habitats must have had their rightful or pretended owner who guarded his property. No matter whether the owner was an Aryan or not, whether it was a mountain chief who ruled over the peaks and valleys where the Soma grew particularly well, or it was a tribe, traders must have, in any case, taken off from there in order to offer the precious produce of their homeland to their neighbours for sale. However, this would not suffice to answer the question why then this trade, with all its details, found a place in the ritual of the Adhvaryu. Its inclusion there has a deeper symbolic meaning." [Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, p16].

"Although a popular way of looking at the Vedic literature perhaps regards the R.gveda in its entirety as a 'religious' document intended to constitute the 'prayer-book' for intricate and highly developed sacrifices offered to the gods, and the Atharvaveda as a collection of purely magical texts for the use of those who devoted themselves to witchcraft and exorcism, it is, as a matter of fact, not possible to make such definite distinctions between the two bodies of literature. The Atharvaveda contains elements

of a religious or mystical nature which are not adequately characterized by the term 'magic' alone, and to the R.gveda belong many texts in which the purely religious element recedes into the background...In performing rites and offering sacrifices to the gods texts could be used and words pronounced which show the belief in man's mastery over powers and natural forces without divine intervention." (J.Gonda, 1951, The R.gvidha_na, Utrecht, NVA Oosthoek's Uitgevers Mij.)

A twice-born man must mutter the ga_yatri_-stanzas relating to the clarifying Soma, viz. (that beginning with) 'With the sweetest' (and so on), i.e. RV 9.1. He must mutter the pre-eminent means of purification, (viz. these) stanzas connected with the clarifying Soma, (being) well-prepared and having quickly plunged into water; (then) he gets rid of all sin. (R.gvidha_na III.1-2; attributed to S'aunaka of Br.haddevata_ which is an enumeration of deities to which each su_kta of the R.gveda is addressed and an explanation of the myths and legends connected with the origin of the Su_ktas).

S'ri_, plasticity

"...a stage ante-dating the metal-moulding technology was attained by the s'ri_-gharma technology. Applied with the ceramics, the technology involves two processes. The first is concerned with s'ri_ which is required for generating plasticity in the clay and the second, i.e. gharma involves the firing of the earthen vessel in order to provide it with hardness. Both of these processes being essential, got mingled in the preparation of ceramics. Interestingly, the very term ceramics which belongs to the Latin *ceramicus*, has linguistically descended from the Greek root *kerannumi* which is equivalent to the Vedic *s'r.n.a.ti* (= *s'ri_*) and Avestan *sara*...both meaning to mix. This is explicitly evident from its several derivatives, such as *kermos* 'potter's earth or clay', *kera_meia* 'potter's craft', *kerameion* 'potter's workshop'...The notable evlutes of *s'r.n.a.ti*-

s'ri_ are *s'arma* and *s'aran.a* which denote in the R.gveda the dwellings made of clay. These are comparable to Avestan *saram* (Yasna 41.6) and *saramno* (Yasna 49.5; 8; 53.3) which possess almost a similar sense...

"S'atapatha Bra_hman.a 14.1.2.10-12 suggests the mixing of the soft soil of ants hill (*valmi_kavapa_*), the soil dug out by the wild boar (*vara_havihatam*) and the plants of a_da_ra (*basella cordifolia*). All these materials were well-kneaded with the help of water to make the soil soft and sticky. In another context (6.5.1.1-6) the text refers to the mixing of the resin (*kas.a_ya*) of the parn.a or pala_s'a (*butea frondosa*) tree, the hairs of a goat (*ajaloma*), the dust particle of pebble (*s'arkara_*), stone (*as'ma*) and the iron-rust (*ayorasa*). Yet another tradition, sketched in the *Taittiri_ya Sam.hita_* (5.1.6.2;3) and in the *Taittiri_ya A_ran.yaka* (5.2.13) contains the names of five materials, such as (i) the fragments of the pottery used in the household (*gra_my_a.n.a_m pa_tra_n.a_m kappa_la_h*), (ii) fragments of the potteries collected from the deserted sites (*armakapa_la_h*), (iii) pebbles of tiny pieces of stones (*s'arkara_*) (iv) the hairs of goat (*ajaloma*), and (v) the hairs of a black antelope (*Kr.s.n.a_jinasyaloma*)...About the use of *as'ma*, the *Ka_tya_yana S'rauta-Su_tra* (16.3.2) enjoins that the hard stones are first brayed into powder and then mixed in the clay (*te_s.a_m cu_rn.aih sam.sr.jati*). For *ayorasa*, the text avers that the rust, separated from the heated iron and known as *ki_t.a*, is to be mixed in the clay. We know from the *S'atapatha Bra_hman.a* (6.5.1.1; 4; 6) that mixing of all these materials was attempted in order to equip the vessel with the desired firmness (*sthemne*)...

Gharma, furnace

A reference to itinerant metal-smiths who make arrows of metal, in the Rigveda (9.112.2) will have to be re-evaluated in the context of this evidence.

jarati_bhiih os.adhi_bhiih parn.ebhiih
s'akuna_na_m
ka_rma_ro as'mabhih dyubhih
hiran.yavantam icchati_ (RV. 9.112.2)

This is a description of a smithy, perhaps an allusion to the making of copper reducing the ores. The metalsmiths sold the products (a copper implement or copper-tipped arrow or golden ornament) to moneyed-people.

“Derived from the Sanskrit root **ghr.**, to heat, warm, gharma has several equivalents in Greco-Latin, Balto-Slavic and Indic languages. Some of them are Church Slavic *gruni_ci_*, *gore_ti*, meaning burn, Serbo-Croatian *granac*, Bohemian *hrnek* = *hrnec*, Polish *garnek*, Russian *gorsook*, Latin *furnus* ‘oven’ and Greek *thermos*, meaning hot. (Buck, CD, 1965, *A dictionary of selected synonyms in the principal Indo-European languages*, University of Chicago Press, Chicago and London, 5.26). Taken cumulatively, these originally indicate heat, burning or oven. The meaning further gets confirmed from the Vedic literature where *gharma* denotes a sacrificial vessel as well as the boiling liquids, heat and furnace. A number of passages in the Vedic literature refer to gharma either in the sense of heat or a fire place or furnace. In the R.gveda 1.112.1, it occurs as an attribute of Agni and indicates a blazing fire. In another passage (RV 3.26.7), the text alludes to fire and employs the terminology *ajasro gharma* to express that it is an inexhaustible source of heat. While describing the preparation of the rice-dish (odana), the Atharvaveda 11.3.18 mentions – carum pan~cabilamukham gharmo'bhinde wherein caru, ukha_ and gharma have been used together but in different sense. The caru signifies the pot to be employed for cooking the rice-dish, whereas ukha_ and gharma respectively mean the oven and heat which form the essential components to accomplish the cooking. Thus the description provides a picturesque account of a pot (caru) lying over an oven (ukha_) and getting sufficient heat (gharma) to boil its contents. There are quite a number of descriptions which conceive gharma in the sense of fire-place or furnace. R.gveda 10.16.10 furnishes an interesting account of replacing a flesh-consuming fire by a new one to

be used in the sacrifice for the Fathers and refers to *gharma* as a place where the undefiled fire is kept. There is no doubt that gharma denotes here a fire-place. A good piece of evidence, affirming the meaning of gharma as a fire-place is further provided by the famous anecdote about Atri, narrated in a number of passages (RV 1.119.6; 180.4; 5.73.6; 8.73.3; 10.80.3) of the text. It is said that Atri, the seer, was once thrown by demons (ra_ks.asas) into a **gharma** whence he was rescued by the As'vins. Some of the passages aver that, in their attempt to rescue the seer, the As'vins covered the gharma with cold water (RV 1.180.4)...it seems to be providing a view of a burning fire-place, more appropriately a furnace into which a seer was thrown in a life-taking attempt but subsequently rescued and the fire was extinguished through sprinkling the water over the furnace. Almost the same kind of meaning is conveyed by a couple of passages successively occurring in a hymn 19.28 of the Atharvaveda. Referring to the binding of an amulet of darbha on the occasion of maha_s'a_nti ceremony, called Aindri_, these invoke the inherent power of the amulet to burn the heart of the foes like a **gharma**. Translating the passages, Whitney takes gharma for the heat. It would be, however, more appropriate to render it as a fire-place or furnace because it is in this famous resort of fire that the capacity to burn something lies...

“Quite interestingly, the Vedic literature evinces a clear knowledge of metal-smelting and metal-casting respectively by the roots **dhma_** and **sic** which are found mentioned as early as the R.gveda. There are several references to the root *dhma_* which stands for blowing of fire in order to generate certain amount of heat to smelt the metal. The meaning has eloquently been expressed by the following passage:

atha sma yasya_rcayah samyaksamyanti
dhu_minah
yadi_maha trito divyupa dhma_teva dhamati
s'is'i_te dhma_tari_yatha_ (RV 5.9.5).

It alludes to *dhma_* thrice, twice as nouns (**dhma_tr.**, the blower of fire or smelter) and once as a verb (**dhamati**, the act of blowing the fire). The passage envisions an inflamed fire and likens it to one blown by a smelter in course of melting

the metal. In the RV 4.2.17, men of noble deeds are mentioned purifying their births as the metal is purified by the smelter. In RV 10.72.2 the creative power of Brahman.aspati is compared to that of a smith (**karma_ra**) who produces the metallic objects by smelting the metal in the fire. Beside these, there are several other instances wherein the root dhma_ signifies the power of creation, evidently by smelting...

“one of these contrivances is **dr.ti**, the bellows made of leather which has been mentioned in the RV 7.89.2 in connection with blowing of fire by the smelter. The same has again been alluded to in the RV 9.1.8 which likens the glittering Soma to shining dr.ti presumably as the latter is always placed in the vicinity of fire. The use of the verbal root dhma_ in this context affirms this assumption. Apart from dr.ti or the bellows of leather, wooden pipes were also used as is evident from the RV 1.85.10.

“References to sic or metal casting technology based on smelting are found only in embryonic form in the R.gveda. Sic means to pour also stands for casting the metal. It is in the previous sense that the root has generally been employed. Nonetheless some of the contexts are pregnant with important implications. Instead of expressing the ordinary pouring of liquids, these depict the placing of creative energies, especially the procreative fluid which results into progeny. This is evident from several descriptions in the text. In RV 6.70.2, Heaven and Earth (rodasi_) are invoked to cast the procreative energies in the sacrificers for the welfare of mankind. (asme retah sin~catam yanmanurhitam). In the succeeding verse (RV 6.70.3) beings of various forms are assumed to be born because of the invigorating power sprinkled by the Heaven and Earth. (yuvoh sikta_ vis.uru_pa_n.i savrata_). In RV 10.61.2 we read:

**sa idda_na_ya dabhya_ya vanvan~cyava_nah
su_dairamimi_ta vedim
tu_rvaya_n.o gu_rtavacastamah ks.odo na reta
ita_u_ti sin~cat**

“He (Rudra) bestowing on his worshippers the gift (of wealth) and the defeat (of their foes), casting down (the ra_ks.asa-s) with his weapons, has

constructed the altar; rapid in movement, most fierce in speech, and shedding the procreative fluid like water around.:

“Here the sprinkling of the procreative fluid is not only different from the ordinary water but also that it has been done with certain purpose, and as the story goes, Rudra created the As’vins by this fluid. The most eloquent description of sic as a creative energy manifesting itself in various forms, occurs in RV 10.184.1, which mentions:

**vis.n.uryonim kalpayatu tvas.t.a_ ru_pa_n.i
pim.s’atu
a_ sin~catu praja_patirdha_ta_ garbham
dadha_tu te**

“May Vis.n.u construct the womb, may Tvas.t.r fabricate the forms, may Praja_pati sprinkle (the seed), may Dha_tr. cherish thy embryo.”

“In this passage, the entire creation is visualized as coming forth from the procreative seed which has been cast by Praja_pati in the womb created by Vis.n.u...the casting of metal in the mould is likened in the R.gvedic fashion to casting of human seed in the foetus...As’vamedhika Parva of the Mah_bha_rata expresses it thus: ‘As liquefied iron, poured (into a mould), takes the form of the mould, know that the entrance of ji_va into the foetus is even such. As fire, entering a mass of iron heats it greatly do thou know the manifestation of ji_va in the foetus is such.’ (yatha_ lohasya nihsyando nis.ikto bimbavigraham upaiti tad vija_ni_hi garbhe ji_vapraves’anam (9); loha pin.d.am yatha_vahnih pravis’ya hhyatita_payet tatha_tvamapi ja_ni_hi garbhe ji_vopapa_danam (10)[Maha_bha_rata, 3rd ed.n. VS; 2029, Gita Press, Gorakhpur]. In a resembling allusion, occurring in the third chapter of the ‘S’ari_rastha_na of the Carakasam.hita_’, we read: ‘In whatever the womb the impregnating conditions occur, of viviparous and egg-born creatures, in what womb they take shape accordingly, as when gold, silver, copper, tin and lead are poured into various wax-moulds.’

[tatra jara_yuja_na_m an.d.aja_na_m ca pra_n.ina_m ete garbhakara_bha_va_ya_myam yonim a_padyante, tasya_m tasya_m yonau tatha_

tatha_ ru_pa bhavanti tad तथा_ kanaka rajata
ta_mratriputsi_saka_nya_sin~cyama_na_ni tes.u
tes.u madhu_cchijr.vigrahes.u)...

So far as a clear reference to the metal casting in the Vedic literature is concerned, it is found in the Atharvaveda which mentions the casting of the thunderbolt (**vajram yamasin~cat**) by Br.haspati.” [VS Pathak and Prem Sagar Chaturvedi, 1998, Antecedent stages in the evolution of metal technology, in: Vibha Tripathi, ed., *Archaeometallurgy in India*, Delhi, Sharada Publishing House, pp. 312-318]

The lexeme, dhamat, in r.ca RV 6.3.4 denotes the act of smelting:

तिग्मं चिद् एम महि वर्षो अस्य भस्म अश्वो न
यमसान आसा ।
विजेहमानः परशुर न जिह्वां द्रविर् न द्रावयति दारु
धक्षत् ॥
स इद् अस्तैव प्रति धाद् असिष्यञ्छिशीत् तेजो
ऽयसो न धाराम् ।
चित्रध्रजतिर् अरुतिर् यो ओर् वेर् न दुषद्वा
रघुपत्मजृलतहाः ॥

(bharadva_ja ba_rhaspatya)6.003.04 Sharp is his path, and his vast body shines like a horse champing fodder with his mouth, darting forth his tongue like a hatchet, and burning timber to ashes, like a goldsmith who fuses (metal). [Like a goldsmith: dravir na dra_vayati da_ru dhaks.at = as a melter causes to melt, he burns the timber; yatha_svarn.aka_rah svarn.a_dikam dra_vayati तथा_gnir vanam bhasmasa_t karoti, as a goldsmith fuses gold and the res, so Agni reduces the wood to ashes; this may imply something more than mere fusion of metals; the alchemical calcining or permutation of the metals would be more akin to the burning of timber, or reducing the metals to ashes.]

6.003.05 He casts (afar his flames) as an archer (his arrows), and sharpens when about to dart

his radiance, as (a warrior whets) the edge of his metal (weapons), he who, variously moving, passes through the night, like the light-falling foot of a bird perched upon a tree. [The edge of his metal: ayaso na dha_ra_m].

In handling metals, the skilled worker uses the process of **gharma**, i.e. firing the earthen vessel to harden it. The word, **gharma**, may refer to the boiling liquids, heat and furnace, in effect, the process of smelting of ores. RV 1.112.1 uses **gharma** as an attribute of Agni, indicating a blazing fire. Ajasro **gharma** (RV 3.26.7) may connote an inexhaustible source of heat (cf. Hindi, **garam**, hot).

The word may also denote a furnace or fire-place. RV 10.16.10 notes that **gharma** is a place where the undefiled fire is kept. Atri, the sage, threw the demons into a **gharma**, wherefrom he was rescued by the As'vins who covered it with cold water (RV 1.180.4). Atharva Veda (19.28) invokes, during the **maha_s'a_nti** ceremony called **aindri**, the power of the amulet to burn the heart of the foes like a **gharma**. (Cognates: Church Slavic gruni_ci, to burn; Serbo-Croatian granac; Bohemian hrnek; Polish garnek; Russian gorsok; Latin furnus (oven); Greek thermos (hot). (cf. Carl Darling Buck, 1965, *A Dictionary of Selected Synonyms in the Principal Indo-European Languages*, Chicago, Univ. of Chicago Press, 5.26).

To smelt the ore, **dhma** is the technique used, with **dr.ti** (bellows made of leather: RV 7.89.2) to control the intensity of the heat generated. Soma is like the shining **dr.ti** (RV 9.1.8). Wooden pipes also served as bellows (RV 1.85.10). It is a reference to the blowing of fire to enhance the heat generated. adha sma yasya_rcayah samyaksamyanti ghu_minah yadi_maha trito divyupa dhma_teva dhamati s'is'i_te dhma_tari_yatha_ (RV 5.9.5). The dhma_tr. is the smelter or blower of fire; dhamati is the act of blowing the fire. The blazing fire is likened to the fire blown by a smelter in the course of smelting the ore. Just as

metal is purified by the smelter, men of noble deeds purify their births (RV 4.2.17); Brahman.aspati's creative power is like that of a smith (karma_ra) producing metalling objects by smelting the ore in the fire.

S'atapatha Bra_hman.a (14.1.2.10-12) refers to the process of mixing materials to make the smelting process soft and sticky or to attain firmness (**sthemne**): valmi_kavapa_, soil of ant-hill, vara_havihatam, soil dug-out by the boar, a_da_ra, basella cordifolia plants. Another verse (6.5.1.1-6) refers to the mixing of **ka_s.a_ya**, resin of the **parn.a** or **pala_s'a** (butea frondosa) tree, goat-hair (**ajaloma**), pebble particles (**s'arkara_**), stone (**as'ma**) and ore-rust (**ayorasa**). *Ka_tya_yana S'rautasu_tra* (16.3.2) elaborates that the hard stones are first powdered and then mixed in the clay: tes.a_m cu_rn.aih sam.sr.jati; and the ki_t.a (rust -- ayorasa -- separated from the heated ore, during smelting) is mixed in the clay. *Taittiri_ya A_ran.yaka* (5.2.13) uses five materials: 1. potsherds from the household (gra_my_a_n.a_m pa_tra_n.a_m kapa_la_h); 2. potsherds from deserted sites (armakapa_la_h); 3. pebble particles (s'arkara_); 4. goat-hair (ajaloma); and 5. hair of a black antelope (kr.s.n.a_jinasya loma).

a_la_kta_ ayomukham is.u (RV. 6.75.15): reference to poison and metal-tipped arrow.

r.s.t.i: a_sr.ukmaira_ yudha_ nara r.s.va_ r.s.t.i_h assr.aks.ata (RV. 5.52.6): javelin thunder spear

brahman.aspatireta_ sam. karma_ra iva_dhamat deva_na_m. pu_rvy_e yuge asatah sadaja_yata (RV. 10.72.2):

This is a reference to metalsmith who blows in a furnace and makes metal objects.

kr.ti: has.tes.u kha_dis'ca kr.tis'ca (a guard and a sword)(RV. 1.168.3)

ks.ura: yada_ te va_to anuva_ti s'oirvapteva s'mas'ru vapasi prabhu_ma (RV. 10.142.4): With the wind at its back, fire wipes out the trees and forests and 'shaves' the land just as the barber shaves (with a razor). Indra is asked to make the man's intellect sharp as the **ks.ura**, the razor, a sharp-edged weapon (RV. 8.4.16).

khanitra: khanama_nah khanitrah (RV. 1.179.6): by the digging spade

kha_di: am.ses.u kha_dayo (RV. 7.56.13): shoulder decoration, sword?

paras'u: s'is'ite paras'um. sva_yasam (RV. 10.53.): sharpened metallic axe. **paras'u** was used for cutting woods and clearing forests (RV 6.3.4)

pra_ca_ gavyantah pr.thupars'avo yayuh da_s.a_ ca vr.tra_ hatama_rya_ni ca (RV. 7.83.1): with big axes came to the east came the cow-plunderers --the da_sas as well as some a_ryas.

va_s'i: va_s'i_a_yasi (RV. 8.29.3): bronze tool-chisel, axe or adze; the **va_s'i** is made of **ayas** (perhaps arsenical copper). The neolithic one was **as'manmayi_ va_s'i** (RV. 10.101.10) made of stone. The lexeme, **ayas**, is used in compounds: **ayahs'ipra** (RV 4.37.4), **ayohanuh** (RV 6.71.4), **ayahsirsa** (RV 8.101.3)--epithets connoting the hardness of the metal (an apparent compound of copper and arsenic or tin). The metal is also characterised by sharpness: **ayaso-dhara**, the sharp blade of the weapon (RV 5.30.15; 6.47.10). Agni is called **ayodans.t.ra** (RV 1.88.5; 10.87.2), an apparent reference to the colour of the teeth of the flames, perhaps reddish. This is corroborated by a reference to the car seat of Mitra and Varun.a which was made of **ayas** and shone like gold in the rays of the sun (RV 5.62.8; YV 5.62.7). The distinction made in Atharva Veda (AV 3.1.7; see also Maitra_yan.i Sam.hita_ 18.2.9) between **ayas** coloured **s'ya_ma-** and **lohita-** (i.e. black and red) is therefore, a reference to copper ore alloyed with

lead and copper alloyed with tin. Jaimini_ya Bra_hman.a (3.17.3) contrasts **loha_yasa** with **ka_rs.n.a_yasa** (called **kr.s.n.a_yasa** in Taittiri_ya Bra_hman.a: 3.62.6.5). The compounds demonstrate the semantics of **ayas**, as copper ore, which when alloyed becomes metal--**loha**, **loha_yasa**, **lohita_yasa**, the red-coloured metal, i.e. bronze. Va_jasneyi Sam.hita_ (18.13) elaborates a list in which **ayas** is contrasted with **hiran.ya**, **loha**, **s'ya_ma**, **si_sa** and **tra_pu** (gold, bronze, black metal (smelted copper?), lead and tin).

Ra_ma_yan.aⁱ refers to a golden image of Sita which was substituted for her during the performance by Ra_ma, of the As'vamedha sacrifice, since Sita was in exile in Va_lmi_ki's hermitage. (**ka_ncani_m mana patni_m ca di_ks.a_rha_yajn-akarman.i agrato bharatah kr.tva_gacchatvagre maha_matih** (R. Uttaraka_n.d.a sarga 91, 25).

Ja_taka of pre-Buddhist India (Cowell, F.B., ed., *Ja_takas*, I, p.343; III, p.93; IV, p. 105; V, p.282) refer to eighteen guilds of workers, including the metalsmith who manufactured agricultural implements, weapons of war in various metals like copper, brass, bronze and iron. Jaina canonical texts describe the processes such as smelting of ore, forging and casting. (Sikdar, J.C., 1964, *Studies in the Bhagavati Sutra*, Muzaffarpur, p. 268; Sikdar, J.C., 1947, *Jaina Canon*, Bombay, p. 187). *Pras'na Vya_karan.a* a Jaina text refers to bronze-smith, **ka_m.syaka_ra** (pp. 193-194). The process of casting is indicated in the Great Epic (As'vamedha Parva), comparing it to the embryonic stage of a child: **yatha_hi lohamis.yando nis.ikto bimbavigraham upaiti tadvajja_ni_hi garbhe ji_vapraves'anam** (18-8): the foetus gets its soul just as the liquid red metal assumes the form of the image when poured into the mould. *Arthas'a_stra* notes that the **loha_dhyaks.a**, the superintendent of mines and metallurgy, oversaw the manufacture of copper, bronze (**ka_m.sya**), lead, tin, sulphurate of arsenic (**ta_la**), **lodhra** and **a_raku_t.a** (R.

Shamasatry, 1923, *Kautilya's Arthas'a_stra*, Mysore, p. 94 ff.) [*Bha_vamis'ra's Bha_vapraka's'a* (Pu_rvaka_n.d.a 69) (Tr. by Girija Shankar Maya Shankar Shastri, Ahmedabad, Sastu Sahitya Vardhaka Karyalaya, pp. 409 and 112) refers to four types of brass: **pittala**, **a_raku_ta**, **a_ra** and **ri_ti**: **pittalam tva_raku_t.am sya_da_ro ri_tis'ca kathyate ra_jari_tibrahmaritih kapila_pin_gala_pi ca**: when the heated alloy in the crucible turns red in colour, the brass is known as **ra_jari_ti** and when it assumes a yellow colour, the metal is known as **brahmari_ti**. *Vis.n.usam.hita_* (Pat.ala 14): **lohe sikthamayi_m arca_m ka_rayitva_mr.da_vata_m suvarna.di_ni sam.s'odhya vidra_vya_n:ga_ravat punah kus'alaih ka_rayed yatna_t sampu_rn.a_m sarvatoghanam**: a complete wax image prepared and coated with clay may be cast as a solid one in gold or other metals properly tested and melted in the requisite temperature by experts) (C. Sivaramamurti, 1963, *South Indian Bronzes*, p. 14).

svadhiti: **ks.n.otren.eva svadhitim sam.s'is'i_tam** (RV. 2.39.7): sharpen the swords/axes on the whetstone. means a sword?

Agni is called '**svadhitir-vana_na_m**' (RV 9.96.6); **svadhiti**, the axe used for cutting trees. **svadhiti** and **asi** are referred to in the context of horse-sacrifice (RV 1.162.20) [*Atharva Veda* (7.41.2) describes the **svadhiti**, the axe as **lohita**, i.e. made of copper; the compound **lohitayas** thus would be an alloy of copper and arsenic or tin, i.e. bronze].

pavi was a weapon of Maruts and was compared with **vajra** (RV 1.66.10). **pavi** was also used as a metal tyre of the wheels of the chariots (RV 5.52.9)

svadhiti (RV 3.8.6), **va_s'i_** (RV 10.53.10; 101; 10) and **paras'u** (RV 1.30.4; 3.53.22; 6.3.4; 7.104.21; 10.28.8) were tools used by **taks.an**. (Cognates: IE root; tek, Greco-Roman technos, Lithuanian tasyati, Church Slavic tasati,

Avestan *tas'a_*: Homer's *tekton* is a worker in wood (Illiad 5.59; 6.315; 13.390); Ahura Mazda who fashions the earth is *geus-tas'a_* (i.e. carpenter of the Mother-Earth: Yasna 29.1; 31.11; 44.6; 51.7). The divine counterpart of **taks.an** is **Tvas.t.r.**, the creator of all forms of the universe. Vedic **taks.** is a reference to creative skills -- of cutting, hollowing, strapping parts and joinery -- to compose hymns (RV 5.73.1; 6.32.1; 9.97.22; 10.80.7), frame chariots (RV 1.111.1; 4.33.8; 7.32.20; 8.64.5), make armour for the gods (RV 4.34.9), carve **yu_pa** (RV 1.162.6; 3.8.6), make wooden vessels (RV 10.53.10; 10.1.10), and fashion vajra (RV 1.32.3; 52.7; 61.6; 121.3; 10.48.3; 99.1). (V.S.Pathak and Prem Sagar Chaturvedi, Antecedent stages in the evolution of metal technology, in: Vibha Tripathi (ed.), 1998, *Archaeometallurgy in India*, Delhi, Sharada Publishing House).

Use of bones in metallurgy

It will be an error to conclude that whatever bones are found in the 'fire-altars' of many sites are related to some 'animal sacrifice'. The bones could have been used as important components of kilns or in the process of oxidation of baser metals from ores.

Archaeologically attested use of bone as a kiln setter



Glazed kiln setter with bone. A glazed terracotta kiln setter with bone fused onto the splayed surface appears to have been an important part of the firing process in the Trench 54

South faience workshop. [After slide 253 from the Harappa excavations after 1996.]

Kautilya's *Arthas'astra* (c. 3rd cent. BCE) describes the purification of silver with lead mixed with copper sulphate and powdered bone, and also heated in a skull. Bone is clearly associated with the cupellation process. In modern times, cupels are made of bone ash which absorbs litharge well. *Rasahr.dayā* (c.

11th cent. CE) describes cupels made of goat bone ash and lined with borax. [PT Craddock, IC Freestone, Lynn Willies, HV Paliwal, LK Gurjar and KTM Hegde, 1998, Ancient History of lead, silver and zinc in Rajasthan, in: Vibha Tripathi, ed., *Archaeometallurgy in India*, Delhi, Sharada Publishing House, pp. 108-133].

Cupellation was used ca. 3000 B.C. to refine gold and also silver. Silver was a product of the district associated with the Hittites, the name of whose capital was written with the ideograph for silver. Silver and lead were found in the mineral called galena (lead sulphide). This mineral could be converted into a lead-silver alloy by roasting it. The roasting oxidizes some of the sulphur. The next step of heating it to a higher temperature further reduced the sulphur content, yielding the alloy at the bottom of the furnace where the charcoal fuel prevented reoxidation. Sometimes, seams of galena contained metallic silver. The silver-lead alloy was melted in a porous clay crucible (the cupel), blowing a blast of air upon it. This oxidized the lead and removed it. The process is completed when a shining button of silver appears suddenly. (T.K.Derry and Trevor I. Williams, 1961, *A short history of Technology*, New York, Oxford University Press, p. 116).

Cupellation removes metals from silver or gold, but by itself will not remove silver; adding salt enables silver to be removed from gold (cementation). For cupellation the gold is alloyed with lead in a special clay vessel, known as a cupel. The product is oxidized by a strong current of air blown into the surface of the molten metal. The base metals get drossed or consumed, as the oxides formed are absorbed by the porous walls of the cupel, while gold and silver survive. Notton (1974) experimented with the method described by Diodorus Siculus and it proved very successful. A series of tests conducted on a nine-carat alloy. In the first, salt and gold alloys were smelted under vigorous circumstances. After five days heating at 800 C, gold recovery was high. It was less so when salt, brick dust, and the alloy were used and

also when tin and lead were added in two different ways. The presence of tin to a greater extent, lead to a lesser, inhibited the recovery rate. (PRS Moorey, 1994, p. 218).

Gold and Silver

By 2000 BC the process of purifying gold-silver alloys with salt to remove the silver was developed....Endogenetic gold ores include vein and lode deposits of elemental gold in quartzite or mixtures of quartzite and various iron sulfide minerals, particularly pyrite (FeS₂) and pyrrhotite (Fe_{1-x}S)...Native gold invariably contains about 0.1 to 4 percent silver.

Electrum is a gold-silver alloy containing 20 to 45 percent silver. It varies from pale yellow to silver white in colour and is usually associated with silver sulfide mineral deposits...

Many gold-bearing ores and concentrates are not readily amenable to cyanidation, owing to the presence of substances that consume the cyanide reagent before it can dissolve the gold, preferentially adsorb the gold as it dissolves (a phenomenon called preg-robbing), or completely surround the gold particles in such a way as to prevent access by the cyanide leach solution. Such ores are referred to as refractory, and they frequently contain the sulfide minerals pyrite, pyrrhotite, or arsenopyrite. Gold can be freed from these ores or concentrates by treating them with various oxidizing processes. The most common method is to roast gold-bearing minerals at temperatures of 450° to 750° C (840° to 1,380° F) to destroy the interfering sulfides... Fire assay is considered the most reliable method for accurately determining the content of gold, silver, and platinum-group metals (except osmium and ruthenium) in ores or concentrates. This process involves melting a gold-bearing sample in a clay crucible with a mixture of fluxes (such as silica and borax), lead oxide (called litharge), and a reducing agent (frequently flour). The fluxes lower the melting point of the oxidic materials, allowing

them to fuse, and the molten litharge is reduced by the flour to extremely fine drops of lead dispersed throughout the charge. The drops of lead dissolve the gold, silver, and platinum-group metals, then coalesce and gradually descend through the sample to form a metallic layer at the bottom of the crucible.

After cooling, the lead "button" is separated from the slag layer and heated under oxidizing conditions to oxidize and eliminate the lead. The shiny metallic bead that is left contains the precious metals. The bead is boiled in nitric acid to dissolve the silver (a process called parting), and the gold residue is weighed.

<http://www.britannica.com/bcom/eb/article/4/0,5716,119894+2+110677,00.html>

In its native state, gold is always alloyed with silver in varying proportions; sometimes also with copper and traces of iron and other metals. Substantial additions of copper would tend to turn the gold red; this is illustrated by a text from Ur in which copper is alloyed with gold to make earrings (Limet 1960: 43-5; Legrain 1947: no.452). Substantial additions of silver would make it green or grey in tone. A stain of film of iron oxide may turn it rose-pink in colour (cf. Lucas 1962: 233-4).

Pliny used the term ELECTRUM to describe alloys of gold and silver with one part of silver to four of gold. Silver may only be separated from gold by a complicated cementing process. Base metals in the ore are, however, slagged off by repeated meltings of native quartz in an oxidizing atmosphere, routine in many goldsmithing techniques. Since gold does not combine chemically with oxygen or sulphur, it is present predominantly in the metallic state (Patterson 1971) either in quartz rock (reef gold: *hura_s.um sha abnisu*) or in alluvial sands and gravel (placer gold: *hura_s.um sha ma'e_shu*). Reef gold particles are mined by crushing and sifting the ore; Didorus Siculus (iii.12-14; 2nd cent. BC) describes the rigours of gold-mining in Egypt (cf. Lucas 1962: 224 ff.) Placer gold deposits are broken down and

carried into river-beds as secondary, alluvial gold. It collects in pockets, commonly found concentrated in the middle of a river. The sand gravel of the river-bed are agitated with water in pans, troughs, or cradles, to get the rocky matter float off and let the gold particles collect in the bottom as gold dust or nuggets.

The Sardis excavators argued that 'the gold is hammered into thin sheets, which are then stacked in a vessel with layers of dry 'pickling mixture' like common salt or alum, and heated for a long time, at 700 C. Silver especially combines with salts and gold is left pure. (Ramage 1970: 22-3). The term *lurpianu* is used in the context of cupellation process (Limet 1986: 288).



In the Akkadian period the silver: gold ratio was 7.5 to 8: 1 (Foster, B.R. 1983: 160)....silver: copper ratio in Early Dynastic IIIA was 1: 180 (Powell 1990: 82)... At Ebla, late in Early Dynastic III or early in the Akkadian period, references to gold are

followed by numbers. These may indicate either parts of gold to another metal in a gold alloy... Leyden Papyrus (X, no.3: Oddy 1983) describes: 'If the gold is pure, it keeps the same colour and remains pure like coinage after heating. If it appears whiter it contains silver; if rougher and harder, it contains copper and tin; if black and soft, it contains lead'...Sumerian literary texts refer to gold from *Aratta* (Pettinato 1972: 79). [Poetic descriptions of *Aratta* state that 'its soil is tin-stone': Cohen, S. 1973: II, 17-19; Shu-Sin (ca. 2073-29 BC) has a text which refers to tin captured as booty in a campaign against Zabshali, a neighbour of Elam somewhere in Iran (Sollberger and Kupper 1971: 152: III A4e) and perhaps also to tin from *Anshan* (Davidovic 1984: 186ff., 200]. Gudea states that he received gold from the mountain of *Hah(h)um* (Statue B, col. VI.33-5),

taken to lie in that part of modern Turkey near Samsat on the Upper Euphrates, and from *Meluhha*...texts refer to the almost mythical land of gold known as (*H*)*arallu*, perhaps somewhere in the Iranian hinterland (Komoroczy 1972; Groneberg 1980: 20)...[I made their figures (deity statues) sublime with shining *shariru* gold, a product of *Arallu* (*shariru*: a poetic term for fine-quality or yellowish gold: CAD N./I:282)...Documents related to Dilmun trade in the later third and earlier second millennium BC indicate that some gold was reaching Ur up the Gulf, whence it came is not stated, it came perhaps from *Meluhha* (Oppenheim 1954: 7; Leemans 1960: 120-1)...Diodorus Siculus (II.XXXVI.2) and Pliny (*Natural History*, XXIII.66) refer to rich sources in India...Classical sources indicate India as a source of silver (Strabo, XV.i.30, cap.700; Ktesias, *Indika*, cap.11)...All the Mesopotamian textual sources (Leemans 1957-71: 505 ff.) indicate that gold was pre-eminently for ceremonial and prestige purposes. It was amassed in temple and royal treasuries, where it was largely reserved for the decoration of buildings and furniture, for the adornment of high-ranking people, or for gifts and offering in both religious and secular contexts. (PRS Moorey, 1994, pp. 219-221). [*Ara_t.t.a* are the name of a people (BS'S 18.44); also called *A_rat.t.a* (BS'S 18.13); MBh refers to them as a tribe in the Punjab].



Partly excavated burial of a lady-in-waiting to a Sumerian royal family of 2500 B.C. was moved intact from Ur to the University Museum of Pennsylvania. Amid the rich ornaments of gold may be seen

the teeth of their wearer. From: Samuel Noah Kramer, 1957, *The Sumerians in: Old World Archaeology, Readings from Scientific American*, San Francisco, WH Freeman and Co.

Headdress with leaf-shaped ornaments, 2600–2500 B.C.; Early Dynastic period IIIa; Sumerian style Excavated at "King's Grave," Ur, Mesopotamia



Gold, lapis lazuli, carnelian; L. 15 3/16 in. (38.5 cm). "This delicate chaplet of gold leaves separated by lapis lazuli and carnelian beads adorned the forehead



of one of the female attendants in the so-called King's Grave. In addition, the entombed attendants wore two necklaces of gold and lapis lazuli, gold hair ribbons, and two silver hair rings. Since gold, silver, lapis, and carnelian are not found in Mesopotamia, the



presence of these rich adornments in the royal tomb attests to the wealth of the Early Dynastic kings as well as to the existence of a complex system of trade that extended far beyond the Mesopotamian plain." The source for carnelian was clearly from Sarasvati Civilization, Gujarat

region, called Meluhha in Mesopotamian records.



Ur, Dummy head with jewellery from an attendant in the Great Death

Pit.

The eight-pointed star on the gold hair ornament of Ur finds a parallel in the silver jewellery of Kunal.

Kunal: Silver ornaments, spiralled silver bangles

Discular beads of gold with axial perforation,



Mature Harappan, Lothal

Discular beads of silver with axial perforation,

Early Harappan, Kunal



The tiara from Kunal has eight petals and is



reminiscent of the tiara in Pu-abi's grave in Ur. A similar eight-petalled tiara adorns the 'ram in the thicket' made of gold plate, also found in Ur, Mesopotamia.

Quartz containing gold ore

Pellets of gold ore (which look like plant stems)

Mortar and pestle used to crush the quartz .

Molten gold being poured from a crucible into a vessel



Pouring molten gold from a crucible into a mould

Potable gold: 'golden fleece' and replicating age-old processes in a Gold Museum

"...the origin of the legend of the Golden Fleece...The

Argonaut legend was known to Homer...the search was for gold and woolled sheepskins were suspended in a stream to collect gold dust from running water. The skin was then suspended between trees to allow it to dry. Support for this view (which was first put forward by Strabo (xi.2.19; who died in AD 19) is gained from the statement in the legend that, when Jason snatched the golden fleece 'from the shimmering of the locks of wool there settled on his fair cheeks and brow a red flush like a flame.'... finer fleeces tend to have more grease;



gold particles being not easily wetted, would stick readily to the grease. Sand particles on the other hand are wetted and would not stick (Barnes, J.W. 1973: Jason and the Gold Rush, *Proc. Geol. Assn.*, 84, 482-5). (M.L.Ryder, The last

word on the golden fleece legend? in: *Oxford Journal of Archaeology*, Vol. 10, No. 1, March 1991, pp. 57-60).

"Jason and the Argonauts

"The technology of mining placer and alluvial deposits can be very simple. Larger gold nuggets can be found with the naked eye and simply picked up. Smaller particles can be concentrated by washing with water in pans, sluices, or specially designed tables, so that the dense metallic particles remain while lighter sand and gravel grains are washed away. All these methods depend on human eyesight, because gold particles that are very small may be inadvertently washed away because they are too small to be seen with the naked eye.

"An alternative is to wash gold-bearing sand and gravel over a woollen fleece. The heavier gold dust sinks more deeply into the wool fibers than lighter particles, and tends to stick to the natural lanolin of the fibers. After a time the gold-bearing fleece was dried in the sun and burned in a high-temperature fire. The gold dust melted into drops that were easily separated from the ashes.

"This method for exploiting alluvial or placer gold, still practised along the rivers of eastern Anatolia in the 1930s, is the basis for the Greek legend of Jason and the Argonauts, who sailed from Greece to search for the Golden Fleece: in other words, they were pirates or traders seeking riches, probably through the Bosphorus along the Anatolian shore of the Black Sea. "



<http://quartz.ucdavis.edu/~GEL115/115CH6.html>

Alchemical tradition is documented in a text dated to the mid-second millennium BC in Mesopotamia; this is reminiscent of the

Rigvedic agnis.t.oma which lasts for days and nights!

"For 5 shekels of pappardillu stone you mix one-third mina of mountain honey, 10 shekels of TA, one su_tu of milk, 4 shekels of red alkali and one-half sila of wine...You test on glowing charcoal... you pour into a stone bowl of algamis'u-stone (steatite)...lute with dough...you heat it for a full day on a smokeless fire. You take out and..for five days, it is (not?) reliable. You soak it in (liquid)...You boil alum and...in vinegar. You steep (the stone) in lapis lazuli-coloured liquid and place it in the fire...Property of Nebuchadnezzar, king of Babylon." (Text 1, Bab. K. 713; A. Leo Oppenheim, *RA*, 60, 1966, pp. 29-45).



Ams'u! Leaf formation on gold from the Mother Lode, Nevada country, California

(Encyclopaedia Britannica). "Gold in rocks usually occurs in invisible disseminated grains, more rarely as flakes large enough to be seen and even more rarely as masses or veinlets. Crystals about 2.5 cm. (1 inch) or more across have been found in California." [In a metaphor of the R.gveda, ams'u is an attribute of soma; it could be a veinlet of metallic ore protrusions on electrum ore: a~s = scales of fish (Santali); ams'a = a portion (G.Skt.); ams'u = the ray, the sun (G.)]

Purification of electrum: ancient metallurgical processes related to gold, silver, lead

Sources of Sumerian gold (2nd half of 3rd millennium BC) "... (gold) bead...alloy of platinum-iridium-osmium and gold...found mostly in placer deposits.. At Muteh...NW of Isfahan...most important deposits of gold known... Damghan lies on the lapis-lazuli trade route to Mesopotamia... lapis mines along the Kokcha river in the Afghan Hindu Kush... apart from possible Arabian and Indian gold.. Gold is

known at Mekar and supplies from this area could have joined caravans carrying lapis-lazuli using the Helmand valley route via Shahr-i-Sokhta to the Persian gulf and then have arrived by the ships carrying the lapis, carnelian, tin and gold from Meluhha to Sumer." (K.R. Maxwell-Hyslop, *Iraq*, XXXIX, 1977, pp. 83-86).

Pliny described electrum as an alloy of gold and silver with one part of silver to four of gold. Normally, in mineralogy, argentiferous gold containing 20-25 per cent of silver is referred to as electrum. "Many of the rare analyses of Mesopotamian 'gold' show that it is in fact electrum, but whether a natural or a deliberate alloy is not invariably clear... Silver may only be separated from gold by a complicated process; but base metals may be slagged off by repeated meltings of native gold in an oxidizing atmosphere, routine in many goldsmithing techniques. Natural electrum can have a substantial copper content... Gold, whose distribution is almost universal, occurs either in veins of quartz rock (reef gold) or in alluvial sands and gravel (placer gold); a distinction found in the textual sources (hura_s.um s'a abnisu; hura_s.um s'a ma'e_s'u)... In its native state gold is always alloyed with silver in proportions that vary greatly; sometimes also with copper and traces of iron and other metals... Reef gold occurs as irregular masses in quartz veins or lodes. The mining process consists first of freeing the gold particles by crushing and sifting the ore, then of separating the gold by making use of the metal's higher density. The classic description of gold-mining in antiquity is that by Agatharcides, preserved by Diodorus Siculus (iii.12-14, 3-4) who, in the second century BC, visited and graphically described the rigours of gold-mining in Egypt (cf. Lucas 1962: 224ff.)... (Royal cemetery at Ur)... a spearhead (U.9122) has 30.30 per cent gold, 59.37 per cent silver, and 10.35 per cent copper (Woolley 1934: 294; table III). The famous rein-ring from RT 800 (Pu-abu) has an equid of electrum (whether natural or artificial is an open question), comprising 65.60 per cent

gold, 31.45 per cent silver, and 2.65 per cent copper, whilst the ring on which it stands is virtually sterling silver (93.5 per cent silver, 6.10 per cent copper, and 0.08 per cent gold). Bowls from PG 755 are also gold-silver-copper alloys (Woolley 1934: 294)... Cupellation will remove metals from silver or gold, but by itself will not remove silver; adding salt enables silver to be removed from gold (cementation)...

Agatharcides (2nd century BC) describes how in Egypt gold-bearing ore was found and washed until more or less pure gold dust remained. This dust was put "into earthen pots. They mix with this a lump of lead according to the mass, lumps of salt, a little tin and barley bran. They put on a closely-fitting lid carefully smearing it with mud and heat it in a furnace for five days and nights continuously; then they allow the pots to cool and find no residual impurities in them; the gold they recover in a pure state with little wastage. This processing of gold is carried on round about the most distant boundaries of Egypt." (Healy 1978, 154) "The procedure was tested in 1974 (Notton 1974) with an alloy of copper and silver containing 37.5% of gold. It was found that heating the pots filled with the alloy and salt gave the highest gold recovery rate of 93%. Including tin, lead or charcoal reduced the efficiency to less than 80%. Healy concluded that the account given by Agatharcides 'seems to be an example of the conflation of at least two processes' (154)..Arthas'a_s'tra mentions salt among the articles necessary for purifying gold: KA 02.14.23 mu_kamu_s.a_pu_tikit.t.ah karat.ukamukham na_li_sam.dam.s'o jon:gani_suvarcika_lavan.am tad eva suvarn.am ity apasa_ran.ama_rga_h".(Diodorus--III,14,3-4; loc. cit. Harry Falk, Refining gold in ancient India : ad JUB 3.17,3 in: *Acta Orientalia* 1997: 58, 47-51).

Barley husks would burn away and the base metals oxidized and absorbed by the crucible (silver is converted to silver chloride by the salt.) (R.J. Forbes, in: Singer et al., *A history of Technology*, 1954, pp. 573-587).

For cupellation, the gold is alloyed with lead in a special clay vessel, known as a cupel, and the product oxidized by a strong current of air blown into the surface of the molten metal. The base metals are consumed, or drossed, as the oxides formed are absorbed by the porous walls of the cupel, whilst gold and silver survive. Precisely what form cementation took before the classical authors offer descriptions of it (Diodorus Siculus, III.xiv.1f. (after Agatharcides); Strabo, III.ii.8) is a matter of continuing debate. Notton (Notton, JHF, 1974, *Ancient Egyptian Gold Refining: a reproduction of early techniques, Gold Bulletin*, 7(2), 50 ff.) experimented with the method described by Diodorus Siculus and it proved very successful. A series of tests were conducted in a nine-carat alloy (in the absence of a suitable gold ore). In the first, salt and the gold alloy were smelted under various circumstances. After five days heating at 800deg. C, gold recovery was high. It was less so when salt, brick dust, and the alloy were used and also when tin and lead were added in two different ways. The presence of tin to a greater extent, lead to a lesser, inhibited the recovery rate. On the evidence of these experiments, earlier suggestions about ancient methods of cementation gain extra credence. The Sardis excavators argued that 'the gold is hammered into thin sheets, which are then stacked in a vessel with layers of dry 'pickling mixture' like common salt or alum, and heated for a long time, c. 700 deg. C. Silver especially combines with salts and the gold is left pure (Ramage A. 1970, 'Pactolus North' in GMA Hanfmann and JC Waldbaum, 'The Eleventh and Twelfth Campaigns at Sardis' (1968,1969), *Bulletin of American Schools of Oriental Research (Jerusalem and Baghdad)* 199: 22-3) . Comparable techniques may have been current in Mesopotamia by at least the Old Babylonian period, to judge from the appearance in the Mari texts of the term *lurpianu* (a salt?), which is associated with the preparation of gold in contexts suggesting cupellation or a comparable process (Limet.H., 1986, *Textes administratifs*

relatifs aux métaux (Archives Royales de Mari 25, Paris): 288)... The role of assaying in ancient Mesopotamia, in which a sample is removed for analysis, is no clearer. Assay by fire, used in a qualitative not a quantitative way, is described in the Leyden Papyrus (X, no. 3: Oddy, W.A., 1983, *Assaying in Antiquity, Gold Bulletin*, 16(2), 52-9), but how early such tests were used is unknown: 'If the gold is pure, it keeps the same colour and remains pure like coinage after heating. If it appears whiter it contains silver; if rougher and harder, it contains copper and tin; if black and soft, it contains lead.' The use of a touchstone (Lapis Lydius, i.e. black chert) to test the relative purity of gold (its approximate carat value in modern terms) is attested by classical authors from at least the sixth century BC (Theognis, 417; Pindar, Pythian, X.67). Theophrastus (de Lapidus, 45) attributes them to the river Tmolus in Turkey. In this case it is siliceous schist (flinty state), black in colour, usually for this purpose deep black, fine-grained; but other black stones may be used.. Streaks are taken from gold alloys of known, graded composition for comparison with streaks taken from the metal to be assayed (cf. Oddy 1983; Moore and Oddy 1985)... Eluere (1986: 59) has shown that two stones from a late third-millennium grave at Telloh (called a 'goldsmith's tomb') exhibit no traces of gold and are not suitable for use as touchstones; the same is likely to be true of an example identified at Larsa in a 'jeweller's hoard' (cf. Arnaud et al. 1979: 20-1, 23, fig.8). These haematite objects are either weights or burnishing stones, as may be the case with a gold-streaked stone reported from Assur (Pedersen 1985: 123, n.7); this type of stone is not appropriate for use in a touchstone...

Sumerian literary texts refer to gold from Aratta (Pettinato 1972: 79). Gudea records receiving gold from the mountain of Hah(h)um (Statue B. col. VI. 33-5; Liverani 1988), taken to lie in that part of modern Turkey near Samsat on the Upper Euphrates, and from Meluhha. In far less explicit terms the names of various mountains reputed to have gold sources are also

recorded (Limet 1960: 94). Various texts refer to the almost mythical land of gold known as (H)arallu, perhaps somewhere in the Iranian hinterland (Komoroczy 1972; Groneberg 1980: 20). Shu-Sin (c. 2037-29 BC) refers to gold from 'Su-land', probably in western Iran, though its location is still open (Edzard, D.O., 1959-60, *Neuen Inschriften zur Geschichte von Ur III unter S'usuen, Archiv für Orientforschung* (Graz) 19, 1-32): 16-18) and from (Mar)daman, possibly identical with Mardin in south-east Turkey (ibid.: 7; Edzard and Farber 1974: 118). Documents relevant to the Dilmun, trade in the later third and earlier second millennium BC indicate that some gold was still reaching Ur up the Gulf at this time, but whence it came, perhaps Meluhha, is not stated (Oppenheim, A.L., 1954, *The Seafaring Merchants of Ur, Journal of the American Oriental Society (New Haven, Conn.)* 74, 6-17: 7; Leemans, W.F. 1960, *Foreign Trade in the Old Babylonian Period as revealed by texts from southern Mesopotamia* (Leiden): 120-1, is more cautious; cf. Leemans, W.F., 1957-71, *Gold, Reallexikon der Assyriologie und Vorderasiatischen Archäologie* (Berlin) 3, 504-31). The renowned resources of Egypt and Nubia (cf. Lucas 1962: 224-8) contributed most certainly in the fourteenth century BC to Mesopotamian royal gold holdings (Edzard 1960; Wilhelm 1974). Then, for the first and only time in its history, Babylonia may have adopted the gold standard and large amounts of gold came from Egypt to assist Kurigalzu I in his major building projects (Brinkman 1972: 274-5; Muller 1982; Powell 1990: 79-82). Hittite inventory texts of the thirteenth century BC record gold from Babylon and Lukka (Lycia) (Kosak 1982: 195)...

So far as is known, there were no sources of gold exploited in antiquity in Mesopotamia, Syria, or Palestine; but the metal is widely reported on the periphery of this region (Maxwell-Hyslop 1977): in Turkey, where there is a preponderance of sources in the west and south-west (Jesus 1980: 82 ff.); in Egypt and Nubia (Lucas 1962: 224-8); in considerable

quantities in western and southern Arabia, not least in Ophir (I Chron. 29: 4; 1 Kgs. 10; Job 22: 24; cf. Maisler 1951), being well known to both biblical and classical authors (Diodorus Siculus, III, xlv. 6 ff.; Strabo, xvi. 4,18,22: Periplus, 36, etc.); in greater Iran, notably in the north of the country and eastwards into Transoxiana and the region of modern Afghanistan, where there are substantial vein and placer deposits (Dunlop 1957; Chmyriov et al. 1973). Diodorus Siculus (II.xxxvi.2) and Pliny (Natural History, xxiii.66) refer to rich sources in India, though traces are no longer easy to detect (Allchin 1962; Ratnagar 1981: 106 ff.) With so wide a range of potential sources within her orbit, many of them in regions whence she is known to have received other metals. Mesopotamia is likely to have had a variety of choices if and when supplies were for some reason blocked in any particular locality. It will be immediately clear that the ancient texts already considered indicate import at various times from all the potential sources zones listed here.

The wide distribution of potential sources does not ease the quest for a scientific method through which Mesopotamian gold sources might be 'finger printed'. It is known that platinum group elements (hereinafter called PGE) such as ruthenium, rhodium, palladium, osmium, iridium, and platinum occur in gold objects from the ancient Near East both in solid solution and as inclusions. On the evidence of the inclusions of the platinum-iridium alloy in a number of Sumerian and other ancient gold objects, notably Lydian gold coins supposedly of gold from the Pactolus valley in western Turkey, Young (W.J. 1972; cf. Whitmore and Young 1973) argued that this region has been an important source of Sumerian gold. Within a few years Ogden (1977), after a comprehensive review, concluded that direct correlation of a gold object and its metal source through the PGE inclusions was not feasible. Maxwell-Hyslop (1977) also questioned the Whitmore and Young hypothesis, pointed to other more likely and closer sources for Sumerian gold,

both in eastern Turkey and in Iran... The gross distinction seems to be that the Sumerians drew upon sources of gold other than those most easily accessible to western regions...

Silver... Silver is found in nature both as a metal and in its non-metallic state. It also occurs in practically all gold. Native silver is rare (20 per cent is abundant as gold; 0.2 per cent as abundant as native copper) and is usually found in quantities not worth melting to make larger, workable lumps (Patterson 1971)... The principal ores of silver are the sulphides (argentite: silver glance) and the chlorides (cerargyrite: horn silver), which yielded up their metal by simple smelting. It has long been generally assumed that most of the silver used in the Near East in antiquity was extracted from argentiferous lead ores, notably galena (lead sulphide) and cerussite (lead carbonate)...it appears, Aegean silver was largely produced from galena.

Two steps are involved in producing silver from lead ores. Lead ore is melted first under the appropriate reducing and/or oxidizing conditions to produce metallic lead. Silver is then extracted from the lead by cupellation by which the lead is oxidised to litharge (lead oxide), leaving behind the silver. For this the lead is heated under strongly oxidizing conditions in a cupel. The lead oxide so formed is absorbed in the porous material of bone or ground-up potsherds in the cupel, leaving silver metal behind. This process may be repeated several times to purify the silver; it is very efficient in freeing silver from such common impurities as copper, antimony, arsenic, tin, iron, zinc (less well for bismuth), in the argentiferous lead. Silver derived from argentiferous galena will be characterized by gold contents from zero to about 0.5 per cent, lead contents between 0.01 per cent and 1 per cent, or rarely a little higher (Gale and Stos-Gale 1981: 107). Silver derived from the native metal, with or without admixture of cerargyrite (a 'dry silver' ore very easily reduced to silver metal), will generally contain less than 0.01 per

cent gold and significant quantities of mercury (ibid.). It is possible that silver was recovered sometimes from the cementation process through which electrum was purified into gold. But there is, as yet, no hard evidence for this from literary, archaeological, or analytical sources, in the area and time range considered here.

It has recently been suggested that liquation, using lead metal to extract silver from copper, thought first to have been described by Agricola in the Renaissance, had already been practised in the Late Bronze Age in installations excavated at Ras Ibn Hani in Syria (Bordreuil et al. 1984: 404-8, figs. 4-5). This identification is doubtful. The Old Babylonian texts from Mari cited in support of the existence of this process in the Near East in the second millennium BC do not sustain the case. They indicate that 'mountain copper' was 'washed' (?purified/refined) to produce 'washed copper' and that lead was used with silver to produce 'washed silver'; but they do not show that lead was added to copper to produce 'washed silver'; but they do not show that lead was added to copper to produce 'washed' silver, which is what would be expected if they are to be taken as evidence for the extraction of silver from copper by liquation (Bordreuil et al 1984: 4071 citing Durand). That lead was plentiful in excavations at Ras Ibn Hani is not relevant to this question. What matters is the method of purifying, and there is no reason to suppose it was liquation either at Mari or at Ras Ibn Hani (cf. Muhly, J.D., 1988, *The wider world of lead ingots, Report of the Department of Antiquities (Cyprus, Nicosia)* 263-5).

Any conjectures about the origins of silver metallurgy in the Near East have to take into account the long interval between the first appearance of lead, some time in the seventh millennium BC in Turkey (Jesus 1980: 76), and the earliest manufactured silver, some three millennia later, when it appears relatively suddenly over a wide area (Prag 1978). Lead, which could only have been obtained by

smelting, had long been experimented with before the appearance of silver. The view, argued over a long period by a number of scholars (cf. Gowland 1920: 132; Hoover 1950: 390; Wertimé 1973: 883), that silver was discovered in the course of the accidental cupellation of lead, remains a strong possibility in the Near East. But, even after the initial discovery, the recovery of worthwhile quantities of silver required the solution of a number of technical difficulties, for a tone of smelted lead will only contain a few ounces of silver.

Oppenheim (1966) published and commented on a text from the library of Ashurbanipal (668-627 BC), for making a silver-like alloy from base-metal ingredients. How much older such deceptions were has yet to be established. The later economic texts from Mesopotamia are much concerned with the quality of silver and carefully stress the percentage of permitted additions; but far too few analyses have been done to offer any information on the ways in which, for specific purposes, silver might be debased. Nor, owing to the way in which buried silver corrodes, is it likely that archaeology will ever provide any check on textual indications that silver surfaces were variously treated with heat (Limet 1960: 49-50). Moreover under field conditions corroded silver may easily be confused with copper or bronze, so the number of silver objects from excavations may at present be underrated.

As Limet (1960: 94) has pointed out, textual indications for the ultimate sources of the silver used in Mesopotamia are singularly rare and meagre. Pettinato (1972: 80-1), in his review of the Sumerian literary evidence, listed such relatively well-known regions in Iran, the Gulf and the Indus valley, as Aratta, Dilmun, Elam, Marhashi, and Meluhha. 'The Silver Mountains' limited the campaigns of Sargon of Akkad to the north-west (Hirsch 1963: 38, lines 22-8) and are usually identified with silver-mines at Keban on the Upper Euphrates, just south of its junction with the Murat river. Manishtushu

recorded a campaign in which his army was divided into two, one part invaded 'Anshan and Sherikhum' in Iran, whilst the other waged war 'up to the silver mines' (Hirsch 1963: 69; Gadd 1971: 438 ff. considers the geographical problems). Heimpel (1982: 67) suggests they might just be 'metal mines'. Gudea wrote of silver from its mountain, taken by Limet (1960: 94-5) to refer to a source east of the Tigris in Iran. In his summary table of the evidence provided by the lips'ur litanies and the HAR-ra series 22, Snell (1982: 212) lists Zar-s'u, Has'bar, la-an-na-ki-ta, and Ku-su as silver sources; but of these places only one may be tentatively identified: Ku-su? = Kush (Nubia) and that seems unlikely before the first millennium BC. It is to the earlier second millennium BC that some of the best textual evidence for the use of Anatolian silver belongs. Larsen (1967: 4) has succinctly described the famous trade between Assur and eastern Anatolia at this time: 'The pattern of the trade as revealed by the texts is clear; tin and textiles were imported into Anatolia and in return silver and gold were sent back to Assyria. The trade in copper was vigorous but seems to have been mainly an internal Anatolian affair.' The silver was either in ingots passing by weight, or sometimes in rings or packages containing bars of metal. Different types of silver are distinguished, probably by quality; various towns in the vicinity of Kultepe (karum Kanesh) are listed as the sources of silver, but they are probably just the principal centres for its distribution (Garelli 1963: 265ff.). Leemans (1960: 130 ff.) preferred not to speculate on the origin of the silver current in Babylonia during the Old Babylonian period, as it was then widely used as currency. There is some indication of silver coming up the Gulf (Oppenheim 1954). Hittite inventory texts of the thirteenth century BC attribute silver to Saqqamaha and Arpa in the north-central region of Turkey (Kos'ak 1982: 197)... Shalmaneser III wrote of going to 'Mount Tunni (Taurus), the silver mountain, (and) Mount Muli, the marble mountain' (Meissner 1912; Luckenbill 1926-7; i.246). According to the 'Foundation Charter' of

Darius I, the silver used in his time at Susa was from Egypt (Vallat 1971)...

Marco Polo documents productive silver mines in Badakhshan (i.24; cf. Chmyriov et al 1973)... Modern mineralogical reports on Afghanistan suggest the sources lay outside this modern political unit, since it is said to have virtually no silver and its numerous lead deposits are very low in silver (Stech and Pigott 1989: 49). India is a possible silver source according to classical sources (Strabo, xv.i.30, cap. 700; Ktesias, Indika, cap. II), though Ratnagar (1981: 140ff.) attributes the rare occurrences of silver in the Indus Valley Civilization to trade with Sumer...

Sources of Silver. "A regular movement of silver from Assyrian merchant colonies of Cappadocia to Mesopotamia is well documented for the period between 1920 and 1750 BCE and texts from Ur which refer to silver being taken overseas by merchants to buy copper in Dilmun (clearly an entrepot) date to the time of Rimsin of Larsa or 1822 to 1763 BCE. It had also been pointed out that silver occurs in the two large Harappan settlements, Mohenjodaro and Harappa, but is almost totally absent at other sites. Another argument for Mesopotamia as the source is that, even earlier, around 3500-3000 BCE and also later, silver and lead were used on a substantial scale in Mesopotamia and Elam. One example is provided by the Early Dynastic III Royal Cemetery at Ur, with a truly exceptional amount of silver (PRS Moorey, 1985, *Materials and manufacture in ancient Mesopotamia: the evidence of archaeology and art*, BAR International series No. 5237. Oxford: British Archaeological Reports: 114 ff., 122 ff.). Second, we now have a run of radiocarbon dates for silver-lead bearing localities of Dariba, Agucha, and Zawar, near Ajmer in Rajasthan, which testify to mining in the later first millennium BCE rather than earlier (PTCraddock et al., 1989, The problem of lead, silver and zinc in early India. In *Old World Archaeometallurgy*. Eds. A. Hauptmann, E. Pernicka and G. Wagner Bochum: Selbstverlag

des Deutschen Bergbau-Museums, pp. 51-69). The only earlier mining is attested to at Dariba, but these dates are post-Harappan, viz. later second millennium BCE....

“Silver was used (Mohenjodaro and Harappa) for making vases and ornaments, such as bracelets, bangles and beads. Asthana (Shashi Asthana, 1993, Harappan trade in metals and minerals: a regional approach. In *Harappan Civilization: A contemporary perspective*. Ed. GL Possehl, Repr. In 1993 in *Harappan Civilization: A recent perspective*, New Delhi: Oxford and IBH Publishing, pp. 271-85) also holds the view that possibly the most promising source for Mohenjodaro and Harappa, is in Afghanistan and Iran (Marshall 1931: 675-77). Lead mines, which could have been a source for silver as well, are situated in Faranjal in the Ghorband valley of Afghanistan and are common in southern Afghanistan, especially at Hazara Jat. Well-known silver mines are also known to have existed near the head of Panjsher valley in the southeastern Hindu Kush and in the vicinity of Heart...Large finds of lead at Harappa (Vats 1940: 58) and Mohenjodaro include only a lead vase and a lead dish (Mackay 1938: 472), a round lead ball with a copper or bronze staple attached to it (Mackay 1938: 476) and a lump which may be the net sinker (Marshall 1931: 30). Balakot had produced a flat, semicircular piece of native lead (Dales 1979). It seems very likely that the Harappans obtained their silver from Afghanistan...Looking at these resource areas in terms of locational proximity to the Harappan culture area, it can be suggested that the Harappans living in Sind were exploiting sources on the southwestern frontiers (Baluchistan and southern Afghanistan). Northern Iran and Soviet Central Asia were then exploited by the Harappans of the Punjab. Those in Gujarat and Saurashtra were apparently getting their raw materials from the more than adequate sources in their own area, as well as from the South, including Mysore. Northern Rajasthan and Haryana must have taken most of their raw materials from central and southern Rajasthan. The seven Harappan settlements at Shortugai on the confluence of the Oxus and Kokcha in the Hindu Kush area indicate that the Harappans of the northern region established trading posts to

monopolize trade in raw materials from north-east Iran and Soviet Central Asia.” (Asthana 1993: 271-85).

R.gvedic Soma as a metallurgical allegory; soma, electrum is deified

Gods in the Rigveda are an allegorical personification of the purification processes (of Soma), just as Soma is an a_pri deity, together with other materials and apparatus (ladles and vessels) employed in the yajn~a, accompanied by r.cas (or, agnis.t.oma).

If Soma is electrum and Indra is burning embers (such as charcoal, indha, used in a furnace), the yajn~a can be interpreted, at the material level, as a process of reduction (or, pavitram, purification), using ks.a_ra, of a metallic ore compound (ma_ks.ika_ or quartz or pyrites) to yield the shining metals: potable (pavama_na, rasa-- raso vajrah, cf. RV 9.048.03, i.e. rasa, vigorous as a thunderbolt) gold and silver (hiran.yam and rayi), after oxidising the baser metallic elements (in the unrefined pyrite ores) such as lead (na_ga or ahi or vr.tra) and copper (s'ulba).

Reducing agents include alkaline as well as combustible materials --vegetable and animal products-- such as: herbs (ks.a_ra), barley--grains and cooked pin.d.a, milk, curds, clarified butter, viands (animal fat), bones (used in cupellation processes, and for making crucibles, during the bronze-age), sheep's hair or wool (reminisced as golden fleece).

For e.g., Soma is described as parvata_ vr.dhah in a verse, that the pyrites are from the mountain slopes:

9.046.01 Begotten by the stones the flowing (Soma-juices) are effused for the banquet of the gods' active horses. [Begotten by the stones: or, growing on the mountain slopes].

The exchange value of gold and silver in Vedic times, is elaborated in metaphorical terms related to wealth and lineage: such as food,

cattle, rain; progeny. It is notable that in Ta_n.d.ya Bra_hman.a, the word, ams'u is explained as amr.toms'u, GOLD, a component of electrum!

Does ams'u mean stalk or shoot? It appears that the word, ams'u connotes a **part**.

Ta_n.d.ya Bra_hman.a classifies ams'u into ten kinds: pratnoms'u = ams'u used in grahaya_ga; tr.ptoms'u = waters; rasoms'u = rice; vr.s.oms'u = barley; s'ukroms'u = milk; ji_voms'u = animal (food); amr.toms'u = gold; r.gams'u and sa_ma_ms'u are also mentioned. When all these types of ams'u get involved, it is called soma and it is the one that is to be offered.

pratnoms'uryamabhis.us.vanti; tr.ptoms'ura_pah
rasoms'uvri_hih; vr.s.a_ms'uryavah; s'ukroms'u
payah; ji_voms'uh pas'uh;
amr.toms'urhira.yam; r.gams'uh;
sa_ma_ms'uh; iti; yada_ va_ ete sarve
samgacchante tarhi sa somah sa sutah

The r.s.i-s run the yajn~a chariot by arranging 40 cups of soma, 12 metres and the r.k-s and sa_man-s:

RV 10.114.6:

s.at.trims'a_s'ca caturah kalpayanta
s'chanda_msi ca dadhata a_dva_das'am
yajn~am vima_ya kavayo mani_s.a
r.ksa_ma_bhya_m praratham vartayanti

Chariot of yajn~a!

The vedi (altar) is the earth and as the agni (fire) raises towards the heaven, the poetic imagination of the r.s.is (priests) expands into realms of cosmological thoughts, unparalleled in recorded history of early human civilizations. Thus, at a cosmic level, the Rigveda raises profound philosophical questions which have been the fountain-head of Indian philosophical traditions.

In such a perspective, the entire Rigveda can be viewed as an allegory, the human quest for

achieving material which has exchange value, in transcending the material level to realms of philosophical explorations, and in expanding the semantic and morphological limits of language to attain new insights into the very concept of 'meaning', using language, through metrical, chanted mantras, as a means of understanding the a_tman and the parama_tman, thereby, attaining svarga, or bliss.

All the su_ktas are thus, governed by a framework of four principal metaphors, rendered in scintillating, ecstatic, spiritual poetic resonance : word, prayer, gods, material well-being.

A precis of this framework may be seen from the following selections:

9.063.25 The brilliant purified Soma-juices are let fall amidst all praises.
9.063.27 The purified (juices) are poured forth from heaven and from the firmament upon the summit of the ground. [The summit of the ground: i.e., the raised place, the place of divine sacrifice, or yajn~a].

पर्वमाना असृक्षत् सोमाः शुक्रास् इन्द्रवः ।

अभि विश्वानि काव्या ॥

पर्वमाना दिवस् पयस् अन्तरिक्षाद् असृक्षत् ।

पृथिव्या अधि सानवि ॥

Adapted from Haug's notes from Sa_yan.a's commentary on Aitareya Bra_hman.a:

Soma Process. The adhvaryu takes the skin (carma or tvac) and puts on it the filaments or shoots of the Soma (am.s'u). He then takes two boards (adhis.avan.a), puts one on top of the Soma shoots, and beats them with the stones (gra_va_n.a). Then the Soma is put between the two boards, and water is poured on them from the vasati_vari_pot. Soma is then shaken in the hota_cup (camasa), wetted again with vasati_vari_water and put on a stone. Grass is

laid on them, and they are beaten so that the juice runs out. The juice is allowed to run into the trough (a_havani_ya), then strained through the cloth (pavitra or das'a_pavitra) which is held by the udgata_. The filtered soma is caught in another trough (pu_tabhr.t). Libations are poured from two kinds of vessels: grahas or saucers, and camasas or cups.

The gods buy Soma from the Gandharvas

Soma is a commodity because it is bought and the texts provide an elaborate sequence for the process of buying involving quarrels with the asura (a pun on the word *a-sura*, i.e. non-sura or non-black salt). It is not a salt, it is a mineral ore. R.gveda does not use the word **asura** in an antagonistic sense vis-à-vis deva; the antagonism is a post-vedic development recorded in the Bra_hman.a-s. Even Sarasvati_ is referred to as *a_suri_ sarasvati_*, i.e. effulgent, powerfully-flowing Sarasvati_.

Spiegel notes that zairipa_s.an (Yt 5.38) denotes the Gandarewa (who lives at the lake Vourukas.a) as a god of light. Zairipa_s.an = zairi + pa_s.an, golden stone. [pa_s.a_n.a = arsenic (Skt.); hari = golden (Skt.)] (Spiegel, *Trad. Lit.*, p. 339). TS 6.1.6.5: **tam somam a_hriyama_n.am gandharvo vis'va_vasuh pary amus.n.a_t sa tisro ra_tri_h parimus.ito vasat tasma_t tisro ra_trih kri_tah somo vasati**, 'As Soma was brought, Gandharva Vis'va_vasu stole it. It remained stolen for three nights. Therefore Soma remains bought for three nights.'

RV 1.108.6: **yad abravam prathamam va_m vr.n.a_no ayam somo asurair no vihavyah**,

'As I said when choosing you at first, we must fight the Asuras for this Soma'.

According to S'Br. 3.2.1.23 ff., the Asuras cry out during their flight *he'lavo, he'lavo*; this is the same as *he'rayah*, 'oh! the enemies!' See Muir, OST, 2nd ed., II, p. 114; Kuhn, Beitrage z. P. Gr., p. 43; Davidson, ZDMG, XXXVII, p.

23; Eggeling, SBE, XXVI, p. 31, n.3) This means that Asuras spoke an Indian dialect. [halla_ = tumult, noise (P.Ku.N.B.Or.H.); halphal = shaking, undulation (CDIAL 14017). helao = to move, drive in (Santali). e_le_lo = a word which occurs often in songs sung by boatmen, e_lappa_t.t.u (Ta.). The mlecchas who shout 'helavo, he lavo' were sea-farers using tossing boats. S.C. Roy (The Asuras -- ancient and modern, Journal of the Bihar and Orissa Research Society, 12, 1926, 147) notes a Mun.d.a tradition that India was previously occupied by a metal-using people called Asuras. The asuric or creative capabilities of the people leads to a description of the River Sarasvati_ as a_suri_ in the R.gveda.

Va_lakhilya 4.1 refers to Manu Vivasvat and Trita among the sacrificers whose Soma pleased Indra once (RV 8.52.1: yatha_ manau vivasvati somam s'akra_pibah sutam yatha_ trite chanda indra jujos.asi a_yau ma_dayase saca_ prs.adhre medhye ma_taris'vani). In Homa Yasht, Vivahvat, A_twya and Trita are mentioned as the first Haoma pressers.

Ancestors are associated with Soma: RV 9.96.11 tvaya_ hi nah pitarah soma pu_rve karma_n.i cakruh pavama_na dhi_ra_h, 'With you, O Soma, our wise Manes conducted their affairs, O Pavama_na'; RV 10.15.8 ye nah pu_rve pitarah somya_sah anu_hire somapi_tham vasis.t.ha_h, 'our Soma-loving Manes, the most excellent ones, who came for the Soma drink'.

RV 8.64.11: ayam te s'aryan.a_vati sus.oma_ya_m adhi priyah a_rji_ki_ye madintamah, 'This Soma is dear to you at the S'aryan.a_vat, at the Sus.oma_, but it is the sweetest in the A_rji_ki_ya'. "A_rji_ka was in fact the name of a territory or of its inhabitants; this territory was situated between the Indus and the Vitasta_, approximately on latitude 32 degrees N...By placing the A_rji_kas in Kashmir or in its neighbouring regions, we add only one more link to the chain of evidence which shows the importance of this mountain

region for the oldest cultural history of the Indian peoples...a Pu_ru found Soma the sweetest in A_rji_ka...The Pu_rus were not popular everywhere. They were called mr.dhrava_c, 'barbarians' in the seventh man.d.ala (18.13)...we may assume that the s'aryan.a_vat is situated in the land of the pan~ca jana_h, that the Pu_rus were settled in A_rji_ka not far from it..." (Hillebrandt, p. 179-183). There is a 'Somb' nadi_ close to River Sarasvati_ flowing in the Punjab and Haryana; this area may relate to Sus.oma. Or, it may refer to Soha_n/Suwan; A_rjiki_ya may be equated with Taus.i_/Tohi/Tawi. [RV 10.75.5 lists: Gan:ga_, Yamuna_, Sarasvati_, S'tudri_, Parus.n.i_, Asikni_, Marudvr.dha_, Vitasta_, A_rjiki_ya_, Sus.oma_, in that order from east to northwest].

'a_rjiki_ya is called vipa_s', so called because it rises in r.ju_ka, or it flows in a straight line. The Vipa_s' is (so called) from bursting forth, or from loosening fetters, or from being extended. It is called fetterless because the fetters of the moribund Vasis.t.ha were loosened in it. Formerly it was called Urun~jira_. Suso.ma_ is the Sindhu, (so called because) rivers flow towards it. Sindhu is (so called) from flowing.' (Niruktam 9.26).

Ludwig notes that s'aryan.a_vat is the eastern Sarasvati_ (Der R.gveda, III, p. 301); Brunnhofer (*Iran und Turan*, pp. 51, 101: Pers. darya, ocean, river, Zend zrayan.h, Skt. s'arya_) sees s'aryan.a_vat in the western, i.e. the Iranian Sarasvati_. Sa_yan.a explains s'aryan.a_vat consistently as a 'lake' in a country called S'aryan.a_, in the hinterland of Kuruks.etra. (Note: hence, the name Harya_na).

Soma: Haoma

"In the R.gveda there is little to suggest a familiarity with Zarathushtra's reformation and with his teachings. I am of the view that the period of the R.V preceded that of Zarathushtra and that the holders of the priestly office offered their services in regions lying far into the West and that the allusion in the RV to the generous

Parthian prince who rewarded the sacrificial service should not be underestimated...precisely in India the Asuras evolved into demons in the later period...The Asuras install the three sacrificial fires A_havani_ya, Ga_rhapatya and Anva_ha_ryapacana in a different sequence than the gods do and thus are deprived of their luck (TBr 1.1.4.4). When a custom has to be rejected as unsuitable it is called an Asura custom. (S'S'S 15.15.11; Gobhila S'ra_ddha Kalpa 3.7)...When did the separation or the hostile contact take place? We can rule out the period prior to the R.V since like the Avesta the R.V combines the word asura mostly with the concept of divineness and sees in r.ta-as.a the expression of highest holiness. We can draw the line only where asura seems to be transformed regularly into a demon, that is between the bulk of the R.gvedic hymns on the one side and that of the Bra_hman.as on the other...The Veda and Avesta cannot be connected directly with one another; many links are missing between the two. The events which took place between the period of the RV and that of the Bra_hman.as are lost for us in obscurity...Already the cry, he lavo, attributed to the Asuras in one passage of the S'Br (S'Br 3.2.1.23), demonstrates that under the word asuras we should understand purely Indian enemies, in this case, definitely eastern enemies just as enemies from Mazendran (ma_zainya) are included among the Dae_vas...TS 6.4.10.1: br.haspatir deva_na_m purohita a_si_c chan.d.a_marka_v asura_n.a_m...(MS 4.6.3 (81.1; S'Br 4.2.1.6) In the course of the Agnis.t.oma both receive two Grahās, the S'ukragraha and the Manthingraha, who are late additions to this sacrifice...marka is the same as Avestan mahrka and denotes 'death' and this is in accord with the belief connected with the Manthingraha that it causes disease and should not be brought close to one who was bound by an oath of allegiance. Such clear etymology does not obtain for s'an.d.a but it recalls the name of the S'an.d.ikas to be found among Indra's enemies, and especially their 'vr.s.abha'..." (Hillebrandt, opcit., II, pp. 265-270).

The yasna, 'sacrifice, worship', is the chief liturgical work of the sacred canon (Avesta). It consists principally of ascriptions of praise and prayer, and in it are inserted the Ga_theta_s, or 'hymns', verses from the sermons of Zoroaster, which are the oldest and most sacred part of the

Avesta. The Yasna (Skt. yajn~a) comprises 72 chapters, called Ha_, Ha_iti. These are the texts recited by the priests at the ritual ceremony of the Yasna (Izashne)...Avesta is rather a Prayer-Book than a Bible. The Vendida_d, Vispered, and Yasna were gathered together by the priests for liturgical purposes...The deity Haoma, the divinity of the plant which produced the intoxicating Soma drink, again finds place in the religious rites...Almost any Sanskrit word may be changed at once into its Avestan equivalent, or vice versa, merely by applying certain phonetic laws...The Av. possesses like facility with the Sanskrit in forming words by means of prefixes, and by adding suffixes of primary and secondary derivation. The same classes of compounds may be recognized in both tongues. The rules of external sandhi, or joining together of words in a sentence, so universal in Skt., are almost wanting in Avesta. The Avesta separates each word by a dot...Almost all the metrical parts of the younger Avesta are in eight-syllable lines. The syntax, however, differs from the Sanskrit in certain points, and shows some marked individualities, especially in the latter portion. (A.V. Williams Jackson, 1892, *An Avesta Grammar*, Stuttgart, W.Kohlhammer, xvii-xxxii).

‘The close affinity in phonology, morphology, syntax and vocabulary etc. has contributed sufficient data for reconstruction of Indo-Iranian mythology. Use of asura (Av. ahura, OP a(h)ura and Skt. asura-) in the sense of 'demon' in late Vedic instead of 'god' as in Av. and OP, and use of daiva (Av. dae_va, OP daiva and Skt. deva-) for 'demon' in Av and OP instead of 'god' as in Skt. and other IE languages shows that at one stage the Indo-Iranian speaking people might have quarrelled with each other as a result of which two sub-groups came out: Iranians and Indo-Aryans.’ (Satya Swarup Misra, 1979, *The Avestan: a historical and comparative grammar*, Varanasi, Chaukhambha Orientalia, p.5)

"The antithesis between the Devas and Asuras was unknown to the RV except in a few cases and was perfected in the Bra_hman.as for the first

time. This antithesis divides the two periods almost in the same way as the demonization of the Devas separates the Avesta from the RV. There are evidences for the fundamental differences like the absence of any definite trace of the belief in the transmigration of souls, the ancient custom of the burning of widows which is, however, unknown to the RV, the total absence of the cult of snakes -- the word sarpa occurs only once in the RV --, the ignorance about the di_ks.a_, the abundant use of the concept of r.ta, which is closely connected with the Avesta and which is later replaced more and more by dharma, not to speak of other phenomena like the Trimu_rti and the linguistic evidences. We notice a considerable amount of differences even between the RV and the Bra_hman.as, a fact which makes us doubt that the origin of the two is directly connected. I count among these differences the fact that the RV refers to many ritual customs, a real connection to which can be found in the verses only with difficulty or not at all, while on the other hand the Bra_hman.as do not give information about the purpose and the position of many hymns in the ritual. It appears as if two different streams of tradition were flowing simultaneously side by side and came close to one another only at a later period...The RV is not the 'Urmythologie', nor the beginning of Indian mythology, but only a chapter in the course of the mythological evolution, preserved by tradition only to that extent as it was compatible with the interests of individual families and schools...that contacts with other dialects are traceable in Vedic Sanskrit disprove the notion that there was a uniformity in beliefs, customs and memories of the tribes who were settling from the Arachosis and Kabul to the Sarasvati_ and farther...Tvas.t.r. did not stand -- as Indra, Soma and Agni did -- in the centre of the religious life of the R.gvedic people, but only on its periphery...It is even possible that the Soma sacrifice and other sacrifices were performed without the guidance of the brahmins. That it was possible can be seen in the example of the Iranians and their Haoma cult...Vedic mythology is not a system, but a conglomeration... [Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, pp.11-18].

"...I may suggest that remote originals of the semi-Vedic Avesta Yas.t compositions, now long lost to us, may have been composed even previously to the Ga_thas;-- and the commentary Lore upon them, which doubtless arose, may have long preserved their more ancient and quasi-vedic tone among certain sections of the population,-- for recruits from the D(a)e_va-party in the Ga_thic conflict must have been gathered from many such-like groups, while they left the impression of their influence upon the authors of some of our Avesta Yas.ts now extant, and this in spite of the final signal predominance of Ga_thic party. But, in view of that victory, all the later Avesta, however unmistakeably it may give evidence of a recrudescence of Vedic feeling, had, or has, felt the influence of the Ga_thic school from their day to this, -- for it is inspired with Ga_thic thought throughout, and its law-book is actually the Vi-d(a)e_va-da_ta 'the Law against the Devas', the Ga_thas having been, as I need hardly recall, almost the continuous battle-songs of a political-religious struggle between the Ahura-worshippers and the D(a)e_va-party." (Lawrence Mills, 1910, *The Yasna of the Avesta*, Leipzig, FA Brockhaus, p.xviii).

At present two priests, viz., Zaotar (Skt. Hotr.) and A_tarevaxs. (Skt. Atharvan) are required to perform Yasna liturgy instead of eight priests in the ancient times.

Av.Ha_vanan is a subordinate priest who pounds the Haoma, derived from ha_vana-mortar and pestle used to pound Haoma.

A_tarevaxs. (Pahl. A_tarvaxs.) is the tender of fire; Fra_bereta_r brings to the Zaotar all the implements and other things required for the ceremonies; A_beretar brings the Holy Water (der. from a_p, water and beret, bringer; the author of the Ni_rangista_n uses a synonym: da_nava_za); A_sna_tar, a_sna_tr, is a priest who washes and strains the Haoma; Rae_twis.kara (lit. one who mixes) mixes the Haoma juice with ga_m jivya_m (milk); Sraos.a_varez (lit. one who keeps good discipline) superintends the sacrifice and prescribes punishment for negligence or

remissness in performing the sacrifice and priestly duties.

These seven priests (plus the eighth, Zaotar), performed functions which are now performed by two priests only: Zaotar and the Rae_twis.kara (Ra_twi-Ra_spi_). Ha_9-11 are recited in honour of Haoma and the sacred Haoma juice is prepared from the twigs dedicated to him. The officiants of the Soma sacrifice are: Hota_, Maitra_varun.a, Accha_va_ka, Adhvaryu, Gra_vastut, Nes.t.a_, Unneta_, Pratiprastha_ta_, Udga_ta_, Prastota_, Pratiharta_, Subrahman.ya, Brahma_, Bra_hman.a_ccham.si_, Pota_, A_gni_dhra, with their president Sadasya-- a total of 17 officials. Avestan tradition remembers 8 of these functionaries.

In phonology, the Avesta agrees with the Sanskrit in its vowels in general. Skt. diphthong e_ appears in Avesta as ae_, o_i,e_. Skt. o_ appears as Av.ao, eu. Avesta inserts epenthetic vowels: i,e, u (Av. bavaiti = Skt. bhavati; Av. haurva = Skt. sarva). In R.gveda 9.101.3 we come across the phrase duros.am...somam, which may be compared with the corresponding Avesta phrase haomem du_raos.em, meaing: Haoma, which keeps death afar or Haoma of far-spreading radiance... (M.F. Kanga and N.S. Sontakke, eds., 1962, *Avesta_, Part I: Yasna and Vi_sparat*, Pune, Vaidika Sams'odhana Mand.a.la). The Vedic hapax os.am 'quickly' may be from older 'burning'; hence duros.a can mean, 'hard to burn', a context which fits the interpretation of soma as electrum subjected to a process of cementation and smelting.

[Similarly the epithet 'drapsa' related to Soma can be explained, both as a 'drop' and 'a spark of fire': m. (2. % {dru}?) a drop (as of Soma, rain, semen &c.) RV. S3Br. Gr2. and S3rS. ; a spark of fire RV. i, 94, 11 ; x, 11, 4 ; the moon (cf. % {indu}), vii, 87, 6 ; flag, banner, iv, 13, 2 ; n. thin or diluted curds L.]

According to Bailey duraus'a ttraha means 'an exhilarant draught'. In Khotanese du_ra- 'hard'

is used in connectin with uysma_- 'soil' as in uysmi_nai pin.d.ai du_ra_ 'a hard clod of soil' (Bailey 1951: 67-- Des'ana_ 22). Doraus'a = *doraus'ma, 'in hard soil'. This interpretation is consistent with the present thesis that soma meant an ore block, quartz or electrum (gold-silver ore block). Yasna 32.14: Zarathushtra speaks of certain miscreants who 'set their thoughts on helping the wicked one, whereby the bovine is ordered to be slain, (the wicked one) who burns the du_raos'a- for help'. Here Haoma is referred to as du_raos.a, an epithet of Haoma. Avesta knows that suma was something that was burned. [Electrum has to be subjected to smelting to separate out the valuable metals: gold and silver from the compound ore].

'When (the solid remains of the twigs out of which the liquid has been well squeezed by the fingers in the strainer are) thoroughly dry, they are put into the fire of Atash Nyayish' (Haug 1884: 402 n.1). This is a reference to Yasna 62.9, after which ritual instructions are for the raspi_ to place ho_m and urwara_m upon the fire (ho_m ud urwara_m kustag o_ a_taxs.dahis.n' (Darmesteter 1892-1893: I,389 n.28). This burning of the residue of haoma is also noted by A. Khodadian (1975: 228-229), F. M. Kotwal (in Boyce 1975: 167 n. 134 and 323) and F.M. Kotwal and J.W. Boyd (1977: 31). [David Stophlet Flattery and Martin Schwartz, 1989, *Haoma and Harmaline: The botanical identity of the Indo-Iranian sacred hallucinogen 'Soma' and its legacy in religion, language, and middle eastern folklore*, Berkeley, Univ. of California Press, p. 65, n. 29].

Hypothesis: The Avesta is comparable to the Vedic Gr.hyasu_tras in the liturgical segments of parallel traditions, which evolved after the movements of people after the desiccation of the River Sarasvati--one group moved towards the Helmand region and another towards the Ganga-Yamuna doab. The high office of the Yazis.n (of the Yasna) consisted chiefly in the ceremonial preparation and offering of the

Paraho_m (Av. parahaoma), i.e. the juice extracted from the Haoma-plant mixed with consecrated water, milk and aromatic ingredients; this represents a time when the Soma yajn~a had already become a 'ritual' or a liturgical performance, as distinct from the material, metallurgical process delineated in the R.gveda to purify soma, electrum.

Physical characteristics of Soma

"Everywhere it is the juicy 'shoots' of light colour with joints, perhaps also with edges, called occasionally 'fingers', 'reeds', once or twice directly 'branches', that are mentioned in the hymns...all the passages agree that it is the 'shoots' or 'stalks' which dupply the drink. The RV states repeatedly that these are bright-coloured...The pavitra, the strainer through which the Soma flows, is like the pavitra in the heavens, the colour of the drops is golden like the lustre of the moon, the drops flowing through the strainer are like rain... te krn.vanti ki_kat.es.u ga_vo na_s'iram duhre na tapanti gharmam a_no bhara pramagandasya vedo naica_s'a_kha_m maghavan randhaya_nah (RV 3.53.14)...naica_s'a_kha...'that which belongs to one which has low branches'...Ya_ska 4.33 says that maganda = kusi_din, i.e. usurer. Pramaganda would then mean 'arch-usurer', and we would have to look for tradesmen in the tribe of Ki_kat.as...two later lexicographers, viz., the author of Trika_n.d.as'es.a 2.11 and Hemacandra 4.26...equate Magadha with Ki_kat.a...The statement of Vis'va_mitra hymn that the Soma has hanging branches is based probably on an old tradition...Avesta-- Yasna 9.16: namyasus....almost synonymous with naica_s'a_kha... 'with bending sprouts...

"arun.a, bright-red, bright-coloured...RV 7.89.1: adhvaryavo arun.am dugdham am.s'um juhutana vr.s.abha_ya ks.iti_na_m 'Adhvaryus, make an offering of the reddish shoot which milked to the lord of the people'...

"babhru, red-brown, brown...Ta_n.d.ya Bra_hman.a 9.5.3... prescribes substitutes of this very colour...

"hari, golden...RV 9.92.1: pari suva_no harir am.s'uh pavitre ratho na sarji saye hiya_nah 'the golden shoot was pressed and hurled on the strainer like a chariot despatched for profit'... Avestan texts speak repeatedly of zairi, zairigaono_ haomo_ (Yasna 9.16, 30;10.12)...RV1.137.3: ta_m va_m dhenum na va_sari_m am.s'um duhanty adribhih 'They milk for you the shoot, which is like a bright-coloured cow, with stones'...

"the colour of the Soma cow...Even Ludwig(Der R.gveda IV,p.3(on 1.49.1) refers to the colour of the cow which serves as the price for Soma... S'Br 3.3.1.14ff.: 'the red-brown one with reddish-brown eyes is the Soma cow. The red one is the property of the Vr.tra-killer, which the king takes over here after he has won the battle... TS 6.1.6.7: arun.aya_ pin:ga_ks.ya_ kri_n.a_ti etad vai somasya ru_pam svayaivainam devataya_ kri_n.a_ti, 'he buys for a bright-coloured, yellow-eyed cow. That is Soma's colour. For its own deity he buys it'...MS 3.7.4.1: ya_run.a_ babhrulomni_ s'vetopaka_s'a_ sucyadaks.i_ tat somakrayan.ya_ ru_pam svenaiva ru_pen.a kri_yate, 'a bright-coloured, red-brown-haired one with white spots and bright eyes; that is the form of the Soma cow. He buys it for its own form'...

"parvan, parus, joint, stalk. parvan, like its synonym parus, means originally 'joint, node'...TBr 3.7.13 (Vaita_na Su_tra 24.1): yat te gra_vn.a_ cicchiduh soma ra_jan priya_n.y an:ga_ni svadhita_ paru_m.s.i tat sam.dhatsva_jyenota vardhayasva ana_gaso sadam it sam.ks.iyema, 'O King Soma, that part of you which they broke to pieces with the stone, your lovely limbs, your sweet joints, you cure that again and let it grow with butter. May we live together without guilt.' Furthermore it is said in Vaita_na Su_tra 24 f.: abhiks.aranti juhvo ghr.tena an:ga_ paru_m.s.i tava

vardhayanti, 'the ladles pour butter over you and strengthen your limbs and joints'...The parvans of the Soma plant occur in a passage of the RV also, viz., in 1.9.1...indrehi matsy andhaso vis'vebhih somaparvabhih maha_n abhis.t.ir ojasa_...Ludwig (no. 448) surmises a pun and translates it as 'in all the limbs of the Soma stalk and at all the Soma festivals'...'Come, Indra, rejoice in the drink, (rejoice) in all the shoots of Soma, mighty and benevolent through your strength'.

"am.s'u, shoot, stalk. am.s'u belongs to the Avestan as well as to the Vedic literature and is employed in both cases for the Soma plant...In Sanskrit am.s'u means 'ray', besides the parts of a plant. In AV 13.2.7 the sun-chariot is called am.s'umat, 'endowed with rays'...The commentary on the TS explains am.s'u quite correctly as su_ks.mo vayavah, 'slender sprout'...characteristic of these shoots is the abundance of juice. RV 8.91.9: yad a_pi_taso am.s'a_vo ga_vo na duhra u_dhabhih, 'when these swelling shoots gave milk like cows with udder'...The shoot is called 'intoxicating', 'inebriating', 'sweet': madira RV 6.17.11; RV 20.6; matsara RV 1.125.3; madhumat RV 4.97.14...the expression bahula_nta in RV 10.42.8: pra yam antar vr.s.asava_so agman ti_vra_h soma_ bahula_nta_sa indram...The PW renders the word, which occurs in this passage only, as 'having a thick end (deposit)'...Sa_yan.a's explanation, bahulam anna_dikam ante yebhyas...bahula_nta can very well mean 'with numerous ends or stolons'. ti_vra means 'pointed'...Thus the verse should be translated as follows: 'into whom the pointed Soma shoots with multiple branches entered in powerful pressings'...It is said often that the shoot roars, thunders, hisses (ara_vit RV 9.74.5; roruvat RV 9.91.3; dhamat RV 8.96.13; stanayat RV 9.72.6; va_vas'a_na RV 9.95.4)"

Note: the use of dhamat is significant; this lexeme is related to the smelting process of electrum; similarly in AV 10.2.11, the waters are called ti_vra_ arun.a_ lohini_s ta_mra dhu_mra_h; a clear metallurgical allegory,

explaining that the word, 'ti_vra_' in RV 10.42.8 can also be explained as 'strong' or 'thick', apart from being 'pointed, sharp', or even 'astringent, seasoned', in reference to the smelted quartz ore. The word ti_vra occurs together with 'rasa' in RV 6.47.1: sva_dus. kila_ya_m madhuma_n uta_yam ti_vrah kila_yam rasava_n uta_yam. The metallurgical context is apparent in the use of the word, 'r.ji_s.in': RV 8.79.4: tvam citti_ tava daks.air diva_a_ pr.thivya_ r.ji_s.in ya_vir aghasya cid dve_s.ah, 'by your insight and your skill, O Soma R.ji_s.in, drive out every wickedness of the sinner'. In RV 3.32.1 also, r.ji_s.in means 'the enjoyer of the husks'. Ya_ska comments on RV 3.68.9: r.ji_s.i_ yadi somo bhipretah tasya r.ji_s.atvam upadyate athendro bhipretah tasya tayor as'vayor r.ji_s.abha_ga_ ity anaya_peks.aya_ r.ji_s.atvam...r.ji_s.i: vajri_vr.s.abhah (RV 5.40.4). Husks are used to generate intense heat in the soma yajn~,a, metallurgical process.

"...RV 8.1.17: sota_ hi somam adribhir em enam apsu dha_vata gavya_ vastreva va_sayanta in narah nir dhuks.an vaks.an.a_bhyah, 'Press out the Soma with stones; wash it in the waters. May men milk it from the stalks by dressing it as it were in the robes of milk'...

Buying Soma at a price

"RV 4.24.9: bhu_yasa_ vasnam acarat kani_yo avikri_to aka_nis.am punar yan sa bhu_yasa_ kani_yo na_rireci_t di_na_ daks.a_ vi duhanti pra va_n.am...Oldenberg (Hymnen des R.gveda, I, p. 153) has convincingly explained that the tenth verse is, so to say, the query of a sinner who offers his Indra for sale...I translate as follows: 'too little came for sale (or for trading) at too high a price'...The pronoun sa in the third pa_da refers to this trader: 'he did not let go even the too little for too high a price (now)'...avikri_ya...it is more appropriate to see a Bahuvri_hi in it, 'one to whom nothing was sold'...The fourth pa_da of the verse informs us what the object of the sale was: va_n.a, the

'reed', the Soma shoot...translation of the verse: 'Too little came for sale at too high a price. When he did not sell to me, I wanted, coming again, to be satisfied with that. Then he (the trader) did not (any more) let the too little go to me for too high a price. Now feeble minds are milking the reed to pieces'...

"andhas, plant, drink...According to the testimony of the PW, the word belongs almost exclusively to the RV, does not occur at all in the Avesta, only twice in the AV, and very seldom in the rest of literature; it appears to have become extinct quite early. Nevertheless, it is old because its relation to the Greek anthos is clear as the day. Haug explains andhas as the Soma branch in bloom...that the eagle collects and brings it, that it originates in heaven (RV 9.61.10), that it is called somasya andhas or somya_m andhas (RV 8.32.28; 10.32.1; 50.7)...andhas is simply the Soma plant...andhas means the 'soma drink' or 'soma juice' (ars. andhasa_ RV 9.1.4; 86.44; dha_ra_ andhasah RV 9.58.1; madhvo andhasa_ yam RV 7.92.1...the god Indu is clearly distinguished from his representative, the andhas. RV 9.51.3 tava tya indo andhaso deva_ madhor vy as'nate pavama_nasya marutah, 'Indu, th gods enjoy your sweet andhas, the Maruts (enjoy) the one who purifies himself...KS'S 19.1.18 prescribes for this s'as.pakraya, the 'purchasing of s'as.pa', and the commentary explains s'as.pa as germinated rice; others think it is only a kind of grass. Besides Indra Sutra_man, only the As'vins and Sarasvati_ are mentioned as the gods to whom offerings are made during the Sautra_man.i_. The refers to the last one in this very context appears to me to be significant; for the deity, who is addresses as s'ubhra in our R.gvedic verse, is precisely the Sarasvati_ on whose banks the Pu_rus were settled. In Indian tradition the Sarasvati_ is regarded as the stream on whose banks the gods sowed barley mixed with sweets. At least, in a magic formula of the AV (6.30.1) it is said: deva_ imam madhuna_ sa_myutam yavam sarasvatya_m adhi man.a_v acarkr.s.uh indra a_sit si_rapatih s'atakratuh ki_na_s'a a_san marutah

suda_navah, 'The gods sowed at the Sarasvati_ barley mixed with honey over an amulet. Indra S'atakratu was the lord of the plough, the abundantly bestowing Maruts were the drivers'. Here the stream is closely associated with the Maruts, and this is exactly the case in the R.gvedic verse. In the latter verse the reference is to the celestial Sarasvati_ and in the former to her terrestrial sister. Just as the divine one is rich in am.s'us or parus', so is probably her earthly counterpart, and andhasi_ are the two plants which supply the most delicious of drinks, Soma and Sura_. adhiks.iyanti, 'to spread out over', means just as much as ujjayati in the passage from the S'Br...Therefore I translate RV 7.96.2 as follows: 'When the Pu_rus seize both the andhas (on your banks) by force, when, you radiant one, be merciful to us as the friend of the Maruts and direct the favour of the mighty ones towards us'.

Note: the two andhas: Soma and s'as.pa [KS'S 19.1.18 notes that some understand s'as.pa to mean germinated grains of rice --vri_haya viru_d.ha_h-- and that some others, however, take it to mean ordinary grass -- tr.n.a] are from the banks of the River Sarasvati_;s'as.pa is a sprouting grass and does not have to related to Sura_. Soma and s'as.pa are both sprouts and andhas (dual) can refer to electrum streaks, deep or young-- one from the panned gold from the river bed and another from the mountains on the banks of the river. Sa_yan.a comments on RV 1.161.8: mun~java_n na_ma parvatah somotpatti stha_nam [Comm. on YS 3.61: mu_java_n na_ma kas'cit parvato rudrasya va_sastha_nam]. RV 10.34.1 compares the charm of the dice to the Soma Maujavata : somasyeva maujavasya bhaks.o vibhi_dako ja_gr.vir mahyam acha_n. In the Baudha_yana (BS'S 6.4), the Adhvaryu asks the seller: mu_javata_h?, 'is this from the Mujavat?'; the seller replies: mu_javato hi (mu_javatparvata_d a_hr.ta iti dhya_yet). [Nirukta 9.8 says that Mu_javat is a mountain: maujavato mu_javati ja_to mu_java_n parvato] The location of Mu_javat may be surmized from MS 1.160 where the sacrificial offerings for Rudra are

plained in a basket and hung from a tree wiht words: 'this is your portion, O Rudra. With this food pass by beyond the Mu_javat(s).' AV 5.22 has the following references:

AV 5.22.5: oko asya mu_javantah oko asya maha_vr.s.a_h ya_vajja_tas (takmam.s) ta_va_n asi bahlikes.u nyocarah

AV 5.22.7: takman mu_javato gaccha balhika_n va_ parastara_m s'u_dra_m iccha prapharvyam

AV 5.22.14: gandha_ribhyo mu_javadbhyah an:gebhyo magadhebyah prais.yam janam iva s'evadhim takma_nam pari dadmasi_

The mu_javatas as a people are related to bahlika_ , gandha_ra and magadha. If gandha_ris lived on the right bank of the Sindhu, bahlika_s lived on the left bank of the river. The Mu_javat was 'probably one of the less high mountains which stretch around the famous Kas'mi_ra valley, on the south-west'. (Zimmer and Grille, *Hundert Lieder*, 2nd ed., p. 156; cf. also Muir, OST, II, p.352).

"The bark of the Soma plant. When the stalk is crushed by stones and the juice flows out, what is left behind is the bark. This bark is called andhas in one passage, RV 9.88.44: mahi_ na dha_ra_ aty andho ars.ati ahir na ju_rna_m ati sarpati tvacam, 'like a great stream he flows over the bark (of the herb). Like a snake he crawls over the old skin'...

"In ABr 2.20.15 a Nigada reads as follows: adhvaryo indra_ya somam sota_ madhumantam vr.s.tivanim ti_vra_ntam bahuramadhyam vasumate rudravate..., 'O Adhvaryus, press the Soma, rich in honey, vr.s.tivani, sharp-ended, thick in the middle, for Indra, whom the Vasus, the Rudras etc. accompany'. S'S'S 6.7.10 adds more adjectives: u_rjasvat, payasvat, 'rich in nourishment, rich in milk'. vr.s.tivani means 'rain-loving'...RV 2.13.1: r.tur janitri_ tasya_ apas pari maks.u_ ja_ta a_vis'ad yasu vardhate tad a_hana_ abhavat pipys.i_ payah am.s'oh pi_yu_s.am prathamam tad ukthyam, 'The season is the mother. Born of her, he soon

entered the waters in which he thrives. Then she became puffed up and swollen with milk. The first juice of the stalk is to be praised'...

Note: maks.u_ = quickly, soon; in the context of Soma as electrum quartz, there could be a pun involved in this term with ma_ks.ika_ which has two meanings: bee and a pyrite: mfn. (fr. % {makSikA}) coming from or belonging to a bee Ma1rkP. ; n. (scil. % {madhu}honey Var. Sus3r. ; a kind of hñhoney-like mineral substance or pyrites MBh.)

"One more passage from the S'Br may be cited here. It contains a name that does not occur anywhere else for the plant that supplies the Soma, 3.4.3.13 (= 4.2.5.15): devo vai somo divi hi_ somo vr.tro vai soma a_si_t tasyaitac chari_ram yad girayo yad as'ma_nas tad es.os'a_na_ na_maus.adhir ja_yata iti ha sma_ha s'vetaketur audda_lakis ta_m etad a_hr.tya_bhis.unvanti, 'Soma is a god. Soma is indeed in heaven. Soma was Vr.tra. The mountains and stones are his body. There grows a plant, us'a_na_ by name. Thus speaks S'vetaketu Audda_laki. They bring it hither and press it'. In the Avesta, Soma is Vr.trahan and possesses sharp weapons; Haoma is veretrajan and hurls his vadare (Yasna 9.30 ff.); this is an assignment of R.gvedic functions of Indra to Haoma in the later-day Avestan tradition. Haoma is zairido_itra, 'golden-eyed' (Yasna 57.19). Just as Soma grows in the celestial waters, Haoma grows in those of Ardvi_Su_ra) (*Bundahis*. 27.4.Darmesteter, *Ormazd et Ahriman*, p. 140)." [Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, p128, 137].

Note: This is the most emphatic statement that Soma has mountains and stones for his body and that Soma is Vr.tra; R.gveda recounts how Indra liberates the Vr.tra part of Soma, i.e. oxidizes the impurities which 'dam' the 'rasa'... RV 5.43.4: madhvo rasam sugabastir giris.t.ha_m canis'cadad duduhe s'ukram

am.s'uh, 'the shining stalk with a beautiful stem milked its mountain-grown, bright honey-juice'.

The colour of the am.s'u is hari (golden), zairi (Avestan, 'golden' or 'yellowish green to green'; cf. Visp. 10.2; 11.2) or, arun.a (Avestan, arus.a, 'reddish'). The lexeme can certainly refer to the electrum quartz which yields gold, after smelting, or 'purification' through the pavitram, for five days and five nights, in intense fire. The words am.s'u/asu, hari/zairi are often referred to as identical descriptive terms in Bha_rata's Soma/Haoma and Iranian mythologies, apart from the use of comparable pressing tools. But the associations are not totally comparable; In Bha_rata, Soma and Agni are cosmic forces of evolution; no similar concept exists in Avesta.

In Avesta, Haoma is a plant; in R.gveda Soma is NOT a plant.

RV 10.97.18 and 19 refer to the samiti or assembly of herbs as 'having Soma as their king' (**somara_jn~ih**). RV 10.97.18 notes: **ta_sa_m tvam asy uttama_**, i.e. an intimation that Soma is present when the highest, perhaps a reference to King Soma is addressed. In RV 10.97.23 this highest authority is addressed thus: 'You, healing plant, you are the highest. The trees are your subordinates' (**tvam uttama_sy os.adhe tava vr.ks.a_ upastayah**). This seems to be an equation of as'vattha as the king or Soma. As'vattha is associated with Soma. RV 10.97 refers to os.adhi, healing plants. RV 10.97.5 notes that os.adhi dwell near the as'vattha, near the parn.a (**as'vatthe vo nis.ada-nam parn.e vo vasatis**. Kr.ta_). In RV 10.97.6 plants dwelling close to the as'vattha are said to be like the kings having come to the samiti. In later times, the samiti is said to consist of nobles and their king. "There is only one 'highest' addressed and only one Soma spoken of. But there are two terms in RV 10.97.5 – as'vattha and parn.a. In middle-Vedic times parn.a denotes the *Butea frondosa*, also called *pala_s'a*. But it seems possible that originally parn.a was nothing but an epithet of the *Ficus Religiosa*. Its leaf, Skt. *parn.a*, is of a particular shape and was already painted on

pottery in Mundigak and in the mature Harappan phase. The *Bhagavadgi_ta*, 16.1 equates the leaves of the *as'vattha* with the rhythmical poetry (*chanda_m.si yasya parn.a_ni*), comparable to AVP 9.25.16, where it is said that its leaves never rest (*as'vatthasya parn.a_ni nelayanti*, for the reading cf. *III*, 10, 1967/78, 239); In both TS 3.4.8.4 and 7.4.12.1 four kinds of trees are listed, and three of them are figs and identical, viz. *plaks.a*, *nyagrodha* and *udumbara*, but the fourth differs: in TS 3.4.8.4 the *asvattha* is mentioned and in the second instance the *parn.a*! In TS 3.5.7.2, the *Butea* and the fig are clearly separated: *ra_s.t.ram vai parn.o vid. As'vattho*. A split in meaning would also explain why the *Butea frondosa* appears as representative of Soma, e.g. in KB 2.2.14 (*somo vai pala_s'ah*), S'B 6.6.3.7 (ditto), TB 1.1.3.10, JB 1.355." (Harry Falk, 1989, p. 89, fn. 55).

Harry Falk (Soma I and II, 1989, *BSOAS*, LII, Pt. 1, pp. 77-90) refers to *Labasu_kta* (RV 10.119) which refers to 'some winged creature, after consumption of Soma, touches sky and earth with its wings and extends bodily even beyond these borders (**abhi dya_m mahina_bhuvam abhi_ma_m pr.thivi_m mahi_m**)...The act of growing in the *Labasu_kta* simply classifies the bird amongst the gods and gives no indication that it was due to the effects of any drug. So, Falk concludes that Soma could not have been a hallucinogenic drug or plant.

Falk further notes from *Aks.asu_kta* (RV 10.34.1) where the poet compares the dice to an 'alerting drink of Soma from mount Mu-javat' (*somasyeva maujavatasya bhaks.o vibhi_dako ja_gr.vir mahyam accha_n*)...Soma is *ja_gr.vi* in e.g. RV 9.36.2; 9.44.3; 9.106.4...It has often been observed that the so-called intoxication caused by the Soma drink enables the poet to compose a hymn. Therefore Soma is called kavi, poet. Hillebrandt (*Vedische Mythologie I*, Breslau, 1927, p. 371 f.) lists many instances showing that Soma helps to create lyrics: in RV 9.95.5, e.g. the drug is called 'procreator of

thoughts' (*janita_mati_na_m*), and in RV 9.107.18 'the poet Soma procreates the thought' (*jana_yam matim kavih somo*). There are several stanzas proving that the poet, feeling wide awake, associates his ability to formulate with the influence of Soma. RV 9.96.18 calls Soma a maker of seers, *r.s.ikr.t*; in RV 8.44.29 Agni is said to be awake like an inspired poet, *vipro na ja_gr.vih sada_*. In RV 9.97.37 Soma is called *ja_gr.vi_* and *vipra* side by side, in RV 9.107.6 the *ja_gr.vi* Soma functions as the *vipra* of the *An:giras*. But the most convincing example may be found in RV 5.44.14 f., where it is said that to someone staying awake the *r.cas* will come and the *sa_mans*, and Soma will declare him with his friend: 14. *yo ja_ga_ra tam r.cah ka_mayante yo ja_ga_ra tam u sa_ma_ni yanti, yo ja_ga_ra tam ayam soma a_ha tava_ham asmi sakhye nyoka_h_*. ..In the *s'rauta* ritual we find the highly esteemed *Atira_tra* rite, consisting of a *Jyotis.toma* day of the *ukthya*-type followed by a nightly session...RV 9.8.9 contains a very similar reference to the drinking of Soma: *nr.caks.asam va_vayam indrapi_tam svarvidam, bhaks.i_mahi praja_m is.am*...it seems beyond doubt that already in the times of the RV the sacrificing priests partook of the Soma drink which had been offered to Indra during the previous night."

This elucidation leads Falk to assume that Soma as a plant...the drug made from it should be energizing, stimulating, and preventing sleep...Ephedra yields a drug 'ephedrine', dissolvable in water...this drug 'has a potent stimulant effect on the cerebrum and the medullary centers...' This may be a far-fetched explanation of Soma as a plant or drug. There is nothing in the specific *r.ca-s* cited to describe Soma as a plant. The metaphors of sleep and being awake may simply be viewed as references to Soma-pressing in *Atira_tra* and with the accompaniment of *r.ca-s* focused on processing Soma. The reference to RV 9.8.9 should be re-interpreted by noting that while Indra 'drinks' Soma the previous night, the priests 'eat' Soma next morning. During the process, Soma gets liquefied justifying the

term, pi_tam; and then becomes solid, justifying the term, bhaks.i_mahi, i.e. 'eaten'.

In Avestan tradition, there is a veneration of a holy plant. "Sir Aurel Stein found burials in the Tarim basin, where Ephedra plants were deposited either by the side of the corpses, or, more strikingly, where tightly tied bundles of Ephedra twigs were placed on the chest of the dead. What was the reason for this custom? The Parsis maintain that this plant does not decay. And an imperishable plant, representing or symbolizing continuity of life, is most appropriate to burial rites, so much so that the Paris 'poured a few drops of the consecrated Haoma juice into the mouth of (a) dying person'...The burial custom in the Tarim basin seems to match the high value the plant receives as amr.tam 'imperishable', 'living', or 'life' in the R.gveda. Lake Lop-nor in the Tarim basin is quite some distance from the Panjab or eastern Afghanistan, but contacts between both regions were good, at least in the period concerned, the third century CE...various Ephedra species are called hum, hom or the like in Baluchi, Brahui and Pashto. Further east we find, e.g. the names som or soma for Ephedra in Gilgit, Chitral, and Nuristan...The origin of this name certainly goes back to at least the second millennium BCE." [Jivanji Jamshedji Modi, *The religious ceremonies and customs of the Parsees*, Bombay, 1922, repr. New York, 1979, p. 54]; cf. Harry Falk, 1989, p. 85]

The term ams'u is amsu 'thread' in Pali. Later the lexeme is interpreted semant. As 'fibre of a plant' (CDIAL 4). The semant. 'thread' may equally apply to streaks of bright, yellowish or bluish green colour (hari/zairi) or even red (arun.a/arus.a) ore in quartz ores and stones.

Rigvedic culture which is a continuing phenomenon in Indian civilization, was governed by a cooperating society among the yajn-ikas and others, both endeavouring to generate wealth:

sama_ne u_rve adhi sangata_sah sam ja_nate na yatante mitha-s-te te deva_na_m na minanti vrata_nyamardhanto vasubhir-ya_dama_na_h (RV. 7.76.5)

Being united with common people they become of one mind; they strive together as it were, nor do they injure the rituals of the gods, non-injuring each other they move with wealth. (Sa_yan.a explains sama_ne u_rve as cattle -- common property of all: sarves.a_m sa_dha_ran.e go-samu_he).

The vedic period was a nascent material culture: the period had weavers; the words siri_ and vayitri_ denote a female weaver. (RV. x.71.9; PB, I.8.9); tasara is referred to which is a shuttle (RV. xiv.2.51). Reference to women workers engaged in weaving is provided: tantum tatam samvayanti (RV. ii.3.6).

Metallurgy in Vedic times

The fire-workers of mature phases of Sarasvati civilization produced lapidary crafts such as stoneware bangles and gem-stones, apart from the use of electrum and bronze for ornaments. The evidence of inscriptions has yielded two silver seals apart from scores of copper tablets used to convey movable property transactions. Another inference may be drawn from the fact that copper was a valuable commodity in those times. The use of a copper tablet to convey a message would strengthen an inference that great importance was attached to the message conveyed through the inscription on such a copper plate.

Like the people of the Sarasvati-Sindhu civilization who were fire- and metal-workers, some people of the Rigvedic culture were fire-workers par excellence. Gold (**hiran.yapin.d.a_n, hiran.yayuh**) was highly valued (cf. RV. vi.47.23, vii.78.9). Divoda_sa gave golden treasures to the r.s.i Garga. Rigveda refers to nis.kagri_va (RV. v.19.3) which is a golden ornament on the neck and necklaces of gold reaching down to the chest.hiran.ya (pl.) means gold ornaments (RV.

1.122.2). Gold was smelted from the ores (PB, xviii.6.4, JB I,10) which evoke the Indian alchemical tradition enshrined in the soma rasa, later elaborated as the science of alchemy: rasa-va_da. In Tamil soma-man.al means, sand containing silver ore. In Egyptian, assem means electrum; in Gypsy, **somnakay** means gold. Gold was won from the river-beds: Sindhu is called the hiran.mayi_ (RV. x.75.8); Sarasvati_ is called hiran.yavartani_ (AV. vi.61.7). [cf. the reference to vasati_vari waters in vedic hymns related to soma, an apparent reference to panned-gold from the Sarasvati_ river-bed.]

"From Vedic Index: ayas. The exact metal denoted by this word when used by itself, as always in the R.gveda (RV i.57.3; 163.9; iv.2.17; vi.3.5), is uncertain. As favouring the sense of 'bronze' rather than that of 'iron' may perhaps be cited with Zimmer (*Altindisches Leben*, 52) the fact that Agni is called ayo-dam.s.t.ra, 'with teeth of ayas' (RV i.88.5; x.87.2), with reference to colour of his flames, and that the car-seat of Mitra and Varun.a is called ayah-sthu_n.a (RVv.62.8), 'with pillars of ayas' at the setting of the sun (note: in the same verse, it is said to be of golden appearance at the flush of dawn). Moreover, in the Va_jasneyi Sam.hita_ (xviii.13), ayas is enumerated in a list of six metals: gold (hiran.ya), ayas, s'ya_ma, loha, lead (si_sa), tin (trapu). Here s'ya_ma ('swarthy') and loha ('red') must mean 'iron' and 'copper' respectively; ayas would therefore seem to mean 'bronze'. In many passages in the Atharveda (xi.3.1.7; Maitra_yan.i_ Sam.hita_ iv.2.9) and other books, the ayas is divided into two species--the s'ya_ma ('iron') and the lohita ('copper' or 'bronze'). In the S'atapatha Bra_hman.a (v.4.1.2) a distinction is drawn between ayas and loha_yasa, which may either be a distinction between iron and copper as understood by Eggeling (*Sacred Books of the East*, 41.90), or between copper and bronze as held by Schrader (*Prehistoric Antiquities*, 189). In one passage of the Atharvaveda (v.28.1), the sense of iron seems certain. Possibly, too, the arrow of the R.gveda (vi.75.15), which had a tip

of ayas (yasya_ ayo mukham), was pointed with iron. Copper, however, is conceivable, and bronze quite likely. Iron is called s'ya_ma ayas of s'ya_ma alone. (AV ix.5.4)...Copper is loha_yasa or lohita_yasa. The smelting (dhma_ 'to blow') of the metal is frequently referred to. The S'atapatha Bra_hman.a (vi.i.3.5; vi.1.1.13; v.1.2.14; xii.7.1.7; 2.10) states that if 'well smelted' (bahu-dhma_tam) it is like gold, referring evidently to bronze. A heater of ayas is mentioned in the Va_jasneyi Sam.hita_ (xxx.14; Taittiri_ya Bra_hman.a iii.4.10.1), and bowls of ayas are also spoken of (AV viii.10.22; Maitra_yan.i_ Sam.hita_ iv.2.13)...aya_sya a_n: girasa. This sage appears to be mentioned in two passages of the R.gveda (x.67.1; 108.8; perhaps x.92.15), and the Anukraman.i_ ascribes to him several hymns of the R.gveda (ix.44.46; x.67; 68). In the Bra_hman.a tradition he was Udga_tr. at the Ra_jasu_ya or Royal Inauguration Sacrifice, at which S'unahs'epa was to have been slain, and his Udgi_theta (Sa_maveda chant) is referred to elsewhere (Jaimini_ya Upanis.ad Bra_hman.a, ii.7.2.6; 8.3; Cha_ndogya Upanis.ad i.2.12). He is also referred to several times as a ritual authority (Pan~cavim.s'a Bra_hman.a xiv.3.22; xvi.12.4; xi.8.10; Br.hada_ran.yaka Upanis.ad i.3.8.19.24; Kaus.i_taki Bra_hman.a xxx.y). In the Vam.s'as, or Genealogies of the Br.hada_ran.yaka Upanis.ad (ii.6.3; iv.6.3), he is named as the pupil of A_bhu_ti Tva_s.t.ra."

S'Br 4.1.3.9 refers to the smell emanating from Soma: 'All the smell the gods removed they placed in the cattle. Therefore, there is putrid smell in (dead) cattle. hence, one should not close one's nose because of the putrid smell, since it is the smell of king Soma'. [cf. MS 4.5.8 (75.1 ff.)]

soma_s trya_s'irah (RV 5.27.5) and traya indrasya soma_h suta_sah (the three kinds of Soma: RV 8.2.7) may refer to gava_s'ir, dadhya_s'ir, yava_s'ir (sweet milk, curd and barley) with which Soma is clothed. (TS 6.1.6.4: a_s'iram ava nayati sas'ukratva_ya). RV 9.8.6: puna_nah kalas'es.v a_ vastra_n.y arus.o

harih pari gavya_ny avyata, 'purifying himself, the reddish and golden one clothed himself with the garments of milk in the jars'; soma puts on a splendid robe: ga_h kr.n.va_no na nirn.ijam (RV 9.14.5).

Intimations of panned gold are seen in the references to Vasati_vari_ and Ekadhana_waters: 'The former should be collected as far as possible from a river that breaks through a mountain. One should do this when the sun is hidden by a cloud, or at least in the shadow of one's person or of a tree or of a hill. If the sun sets before the waters are collected, one should, after making offerings to the sun, hold a fire brand over the vessel, put a piece of gold in it and then fill it. Water from the vat of a brahmin also serves the purpose if that brahmin had already performed the Soma sacrifice.(A_pS'S 11.20.5; S'Br 3.9.2; KS'S 8.9). These Vasati_vari_s are meant for pouring over the Soma plant. (somopasarga_rtha_ a_pah: A_pS'S 11.20.5). Before the preliminary pressing begins, the Hotr.-camasa is filled with these Vasati_vari_s (S'Br 3.9.3.30; 4.14; KS'S 9.3.15; A_pS'S 12.9.1). The waters in the Hotr.camasa, employed for soaking the plants, are called Nigra_bhya_s. The second variety, the Ekadha_nas (KS'S 9.2.23; 3.7 ff.; A_pS'S 12.5.5), are collected early in the morning...from flowing water at such a distance from the sacrificial place that one can still hear the voice of the Hotr. reciting. One fills three or more vessels and also the Maitra_varun.acamasa with the words, 'I take you, the juice, for the Soma of the Mu_javat'. These Ekadhana_s serve exclusively the purpose of diluting the Soma and are added to the juice itself. (A_pS'S 12.2.13: somavardhana_rtha_h).[Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, pp.301-302].

A_pS'S 12.16.11: 'According to the need he pours from the Ekadhana_s -- besides these, all the water in the Maitra_varun.acamasa -- in the A_dhavani_ya. Then he pours the Soma which

is in the A_dhavani_ya and is mixed with water partly into Pu_tabhr.t, having spread the woollen strainer over it previously.' RV 9.21.3 notes: sindhoru_rma_ vy aks.aran: the Soma drops dissolve on the surface of the water and spread a bright glimmer in the water: RV 9.76.1 harih sr.ja_no atyo na satvabhir vr.tha_pa_ja_m.si kr.n.ute madhi_s.v a_. 'The king who dives into the streams in RV 9.86.8 is the god Soma in heaven as well as the terrestrial drink, which indeed is a part of the former. The same is the case in RV 9.68.6'. RV 9.79.4 adrayas tva_ bapsati gor adhi tvaci apsu tva_hastair duduhur mani_s.in.ah, 'The stones chew you on the cowhide; with their hands the wise men milked you into the water.' RV 9.97.57 hinvanti dhi_ra_ das'abhih ks.ipa_bhiih sam an~jate ru_pam apa_m rasena, 'The wise men send him forth with ten fingers and decorate his form with the juice of the waters'. [Avesta refers to ap haomya, 'Haoma water' (Yasna 3.3), a reference to water mixed with Haoma].

[The commentary notes: ya_vati_bhiih vardhitam rasam pra_tahsavana_ya parya_ptam manyeta ta_vati_bhiih; KS'S 9.3.21-22 states that apart from the water in the Maitra_varun.acamasa, one third of the Vasati_vari_s and the same amount from the Ekadhana_s should be poured into the A_dhavani_ya; the objective is clear: vardhitam rasam, or somavardhana_rtha_h, enriching the rasa, with panned gold; hence the lexeme - dhana, (i.e. 'wealth') in the compound: ekadhana_].

Soma's s'ri_ is milk; s'ri_ is prosperity; many times in RV, the term abhi-s'ri_ is used to intensify s'ri_; in RV Khila_ Su_kta, cikli_ta or 'purchased Soma' is designated as the son of S'ri_:

References are to Usha R. Bhise, 1995, *The Khila-Su_ktas of the R.gveda_ A study*, Bhandarkar Oriental Series No. 27, Poona. The S'ri_su_kta is a part of the Khila su_kta with 19 verses. Ja_tavedas is invoked to bring in s'ri_. Ka_ty. S'r.S. (4.15.4) suggests the offering of oblation early in the morning in Agnihotra to

attain s'ri_. A_p. S'r. S. (4.2.1) notes that s'ri_ is brought by chanting a mantra in the dars'a-pu_rn.ama_sa yajn~a. Verse 2.6.12 reads as follows: a_pah sravantu snigdha_ni cikli_ta vasa me gr.he ni ca devi_ ma_taram s'riyam va_sayam me kule Trans.: May the friendly waters flow. O oft-purchased (Soma), stay in my house. Make the divine mother Prosperity reside in my family. Bhise notes: cikli_ta is traditionally regarded as the son of s'ri_. The word sound unusual because of the cluster kl. On applying the law of 'ralayorabhedah', the word may be restored as cikri_ra PPP. From the Redup. Base of kri_ 'to purchase'. cikri_ta is soma that is purchased by the sacrificer before he performs a soma-sacrifice. The word, thus, has reference to the ceremony of Somakrayan.a A second give-away is in Verse 2.6.17 which suddenly refers to 'mud' (which is obviously associated with any quartz ore block with protruding mineral streaks): kardamena praja_sras.ta_a sambhu_ti gamaya_masi adadha_dupa_ga_dyes.a_m ka_ma_n sas.ru_jmahe Trans.: The progeny has been created by the mud. Let us urge it towards prosperity. He (the priest) has deposited (the soma) has approached (the patrons), whose wishes were released by us (towards the gods). Bhise notes: praja_ = of the soma plant; gamaya_masi = releasing the streams of soma in honour of gods leads one to prosperity. Verse 2.7.1 (a hymn which can be grouped with the earlier s'ri_su_kta): cikli_to yasya na_ma taddiva_ naktam ca sukrato asma_n di_da_sa yujya_ya ji_vase ja_tavedah punantu ma_m devajana_h Trans. O Ja_tavedas, possessed of good mental power, one whose name is Cikli_ta (purchased soma) has by day and night shone for us for companionship and life. May the divine people purify me. Bhise adds: punantu etc.: this line occurs at RV 9.67.27 in the context of purification. Taitt. Br. 1.4.8.1 includes this as a purificatory mantra in the performance of Va_japeya yajn~a. "The mention of Cikli_ta 'the oft-purchased soma' is a corroborative piece of evidence about the sacrificial set up in which soma is an indispensable element. The adjectives jvalanti_

v.4, pin:gala_ v.13, yas.t.i v.14, undoubtedly refer to soma-plant. Judging as a whole, the hymn (2.6) is a prayer for the prosperity of sacrificial materials like soma, cattle food (pus.t.a) which ultimately yields milk etc. used in sacrifices, a flawless build of cattle, kari_s.a (the dust strewn around sacrificial altar). Only on such assumption can be satisfactory explain the expressions like 'yasya_m vindeyam (vv.2,15), 'manasah ka_mam...va_cah satyam' (v.10) and words like ki_rti, vr.ddhi (v.7). Thus, the connotation of S'ri_, as we get it here, is the prosperity of sacrificial materials and particularly of soma. But there is an undercurrent which believes that S'ri_ is the abhima_nini_devata_, which is a step towards her deification in the Gr.hyasu_tras where sacrifices are offered to her. Cikli_ta. In the same su_kta, we come across a curious word cikli_ta who is said to be the son of S'ri_ by the tradition; likewise, Kardama and A_nanda are also believed to be the sons of S'ri_. The origin of this tradition may be traced to v. 12 of the S'ri_su_kta in which cikli_ta has been requested to establish Mother S'ri_ in the house of the poet-seer...The first verse of the next hymn (2.7.1)...Here Cikli_ta has been identified with Ja_tavedas in unambiguous terms. It may be pointed out that the S'ri_su_kta as well as the following two hymns are grouped together, as all of them have Ja_tavedas as their chief deity. V.19, i.e. the concluding verse of the S'ri_su_kta appears also as the concluding verse of both of them. It is a prayer for purification, increase of wealth, freedom from sin and difficulties...In the S'ri_su_kta itself, the brilliance of soma-plant has been emphasized (vv. 4,5,13) and its golden appearance as well. Thus, brilliant appearance also forms a basis of identification of Agni Ja_tavedas and Soma Cikli_ta." (pp. 20-22). The purification of Cikli_ta soma, the oft-purchased yajn~a ingredient is the road to s'ri_, prosperity. In the toposheets of Survey of India, close to Sarasvati Nadi_ near Adh Badri is shown a place called Lohargad.h. The local revenue officials informed me for time immemorial, licences have been given to gold-panners in this place

who pan for gold from the river-sands of the hiran.yavartini_ Sarasvati_. Buy the quartz and add the vasati_vari_ waters from the Sarasvati_ in the process of agnis.t.oma to yield the purified metal, which is prosperity personified. Thus, the Khilasu_kta corroborates the arguments provided elsewhere that the reference s to soma in the R.gveda are references to the process of purification of quartz (ellectrum) ore to produce potable gold and silver. Verse 2.6.1 of the S'ri_su_kta reads: Hiran.yavarn.a_ harin.i_ suvarn.arajatasraja_m Candra_m hiran.mayi_ laks.mi_ ja_tavedo mama_ vaha Trans.: O Ja_tavedas, bring unto me Prosperity which has the colour of gold, is possess of hari (soma), is wearing a garland of gold and silver, is lovely and full of gold. Bhise notes: harin.i_m: hari stands for soma...The repeated reference to gold emphasizes the brightness of soma. Rajata: the silvery appearance of the soma at night. One does not have to search for an ephedra or a divine mushroom to gain prosperity processing soma. Any organic plant product would have been reduced to pure carbon if subjected to five days and five nights of incessant firing at around 1500 degrees C. The references to gold and silver in the context of cikli_ta and s'ri_ are clearly direct references to the purchased ore being reduced to the shining, bright, element metals: gold and silver. Ephedra may have become a ritual substitute when the raw-material sources became tough to access as the pastoral metallurgists moved along the banks of River Sarasvati_ and after her desiccation, towards the Helmand, towards the Gan:ga_-Yamuna_ doab and south of Gujarat. The references to asura among the Mun.d.as (near Santal Paraganas), metal workers par excellence may point to a substratum of R.gveda which was nurtured in the Mun.d.a country close to the banks of the River Sarasvati_. Of course, soma is the only (metallurgical, purificatory) process elaborately described in the R.gveda. No wonder, soma constitutes the very essence (rasa; note: rasava_da = alchemy; the term in Ancient Tamil for refined gold is vetaka-p-pon-) of the

R.gveda and no wonder, the poet-seer is often seen referring to the devata_s (allegories of the sacrificial materials used in a yajn~a) to bestow him with material prosperity.

RV 4.41.8:s'riye_ na_ ga_va upa soman asthuh indram giro varun.am memani_s.a_h,'just as the milk has gone to Soma to become his ornament, so have my songs to Indra, my thoughts to Varun.a'.

RV 9.16.6: puna_no ru_pe_ avyaye vis'va_ars.ann abhi s'riyah s'u_ro na go_s.u tis.t.hati, 'flowing towards all the ornaments...'

RV 8.72.13: a sute sin~cata s'riyam rodasyor abhis'riyam rasa_ dadhi_ta vr.s.abham, 'pour into Soma that which makes him prosper...'

Soma goes through many forms, ru_pa:

RV: 9.25.5 vis'va_ ru_pa_n.y a_vis'an puna_no ya_ti haryatah,'entering all the forms, purifying himself, the desirable one moves forth.' RV 9.34.4: sam ru_pair ajyate harih; thus in RV 9.81.1, the richly adorned (supes'as) all the forms of Soma enter into Indra's body.

KS'S 8.4.28: 'He digs the resonance holes (uparava) under the shaft of the cart standing in the south...8: In the same order as he has dug, he throws the earth out of the holes uttering the mantras: 'Here I dig out the magic which a strange or a servant has buried'. 10: ' he digs them one arm deep. 16: The Adhvaryu asks: 'O Sacrificer, what is here?' 17: The latter replies: 'It is prosperity'.

18: 'The Adhvaryu whispers: 'This is common to us both'

20: '[After they have given each other their hands through the opening below], the sacrificer asks: 'O Adhvaru, what is here?'

21: 'Upon being told 'prosperity', the sacrificer says: 'this is for me'.

22: 'He besprinkles these holes with the words: 'I besprinkle you, you who kill the Raks.as, you who kill the magic, you who belong to Vis.n.u'.

24: 'He pours [the rest of the water into the holes], with the words: 'I pour upon you, you who kill the Raks.as' etc., and covers them with Darbha grass etc.

25: 'Having placed thin blades of kus'a grass over the resonanceholes, he puts over them two boards on which the Soma is to be pressed. [S'Br 3.5.4.22. Eggeling (SBE, XXVI, p. 140, n.1) speaks of these boards: 'The pressing boards are a cubit long, and somewhat broader behind than in front. They are placed one south of the other, and so as to lie close together behind (sam.baddha_nte, Ka_n.va rescension), or the space of two inches between them. The space between them is filled with earth.' According to the A_pS'S 11.13.5 two resonance holes are covered with the southern and two with the northern pressing board]. They are (made of Varan.a wood and one span wide) separated from each other by two fingers width, ends pointing to the east, cleansed, one arm in length and joined to each other or not joined. He heaps (earth) around them so that they remain steady and do not move during the pressing. (A_pS'S 11.3.7 notes that this is earth dug out from the holes).

26: 'On these two boards he places a red skin cut equally all around (with the fur upwards and the neck towards the east), saying 'you belong to Vis.n.u'. (A_pS'S 12.2.14 notes that the hide for pressing is cut out from the hide used during the measuring of Soma. It is rough (not smoothened), cut all around, has four folds (put.a) in which the stones are placed, and above a drain (uparis.t.a_d a_secana); HS'S 7.6: lohitaṁ a_naduhan uparis.t.a_lloma_secanaṁ yatha_bhis.ava_yopa_ttaṁ bhavati). Note: the reference to 'lohitaṁ' in HS'S.

27: 'Upon this the five stones: 'You all belong to Vis.n.u'.

28: 'To the east of this he raises a square mound with sand (for the Soma vessels) on a place marked and besprinkled earlier.' [Later when the vessels required for the Soma sacrifice are placed on this khara, the Upa_m.s.usavana stone, i.e., the stone with which the Upa_m.s.usavana is pressed, should be placed, according to A_pS'S 12.1.9, between the Upa_m.s'u vessel and the Antarya_ma vessel in such a way that it touches both the vessels and its mukha faces the south].

29: A_pS'S 12.2.15 describes the five stones: 'They are one span wide with a high back and are suitable for hitting. He places the biggest one, the Upara, in the middle as the fifth.' [KS'S 1.3.36 notes about the width of the stones: pus.kara_ gra_va_n.o hastaparn.ama_tra_h]. A_pS'S 12.3.1: 'The hitting surfaces are rather wide'. (sthavi_ya_m.si). A_pS'S 12.3.2: 'He addresses them with the mantra: 'You the abodes of the waters, offsprings of the R.ta, guardians of the world, eagles, guests, peaks of mountains...invoke Indra with your sound, chase the enemies away with your thunder. You have been harnessed. Drive on! Drive the sacrificer to the celestial world!'

RV 1.89.4 equates the stones with the gods and calls them: gra_va_n.ah somasuto:

**tan no va_to mayobhu va_tu bhes.ajam tan
ma_ta_ pr.thivi_ tat_pita_ dyaus tad
gra_va_n.ahsomasuto mayobhuvas tad
as'vina_**

So do RV 7.35.3 and 10.108.11 adore the stones as gods.

RV 5.31.5 notes that they even surpass the gods:

**divas' cid a_ vo mavattarebhyo vibhvana_
cid a_s'vapatarebhyah va_yos' cid a_
somarabhastarebhyo agnes' cid
arcapitukr.ttarebhyah**

RV 10.94.5 explains how the pounding of the Soma plant occurs:

suparn.a_ va_cam akratopa dyavi a_khare
kr.s.n.a_ is.ira_ anartis.uh nyam. ni yanty
uparasya nis.kr.tam puru_ reto dadhire
su_ryas'vitah , 'The birds (stones) raised their voice to heaven. The nimble black ones hopped on the hollow. They go down to the abode of the Upara. From it, which is bright like the sun, they receive much juice.' The RV 10.94.5 is repeated in AV 6.49.3. AV 6.49.2 elaborates on the pounding process:

**mes.a iva vai sam ca vi corvacyase yad
uttara dra_v uparas' ca kha_datah
s'i_rs.n.a_ s'iro psasa_pso ardayan am.s'u_n
babhasti haritebhir a_sabhih**, 'Like a ram you move to and fro, when you, O Uttara (the upper stone with which Soma is crushed), and the Upara consume (Soma) on the wood'. [dru is a

wooden base, the adhis.avan.aphalaka. RV 10.175.3 refers to several Uparas: gra_van.a upares.v a_mahi_yante sajos.asah]. RV 5.31.12: vadan gra_va_va vedim bhiya-te yasya ji_ram adhvaryavas' caranti, 'The speaking stone (cf. the resonance holes referred to in KS'S 8.5.25) should be placed on the vedi, the stone for whose quick movement the Adhvaryus approach'.

RV 1.109.3: ta_hy adri_dhis.an.a_ya_upasthe, 'for, the two stones are on the lap of the vedi'. [dhis.an.a_ = earth; the Vedi; or, a bowl-like shaped hollow in the ground; the Soma falls down from the lap of the dhis.an.a_-- (10.17.12); or, 'it was a sort of support on which the pressing-stones rested' (Oldenberg, SBE, 46, 120-122)]. The sacrifice is called 'karman' in RV 9.97.33: 'Soma, swelling the streams with toil (karman) at the gods' banquet'; karma_ra of ancient times, is a metalsmith.

Soma is not pressed between the stones but upon them. Under the stones, a cowhide was spread.

The Upa_m.s'usavana, the preliminary pressing is followed by the Maha_bhis.ava, the main pressing which is done by Adhvaryu, Pratiprastha_tr., Nes.t.r., and Unnetr.; each one gets a stone and a part of the Soma. KS'S 9.5.6: all the four priests fasten a piece of gold to their fingers and take their stones; then pouring the Nigra_bhya_s, dividing Soma in four parts, and crushing Soma with the stone in an unlimited number of strokes.

RV 3.52.1,5,6 (theVis'va_mitra hymn) are the Puroduva_kya_ verses recited during the cake-offerings of the three Savanas. Pressing of Soma and baking/frying grains are mentioned together: RV 4.24.7: ya_indra_ya_sunavat somam adya_pa_ca_t pakti_r uta bhr.jja_ti dha_na_h; RV 6.29.4: sa_soma dmi'slatamanah suto_bhu_d ya_smin paktih pacyate santi dha_na_h; RV 8.32.8: suno_ta_somapa_vne somam indra_ya...pa_cata_pakti_r. The Savani_ya Purod.a_s', the cake offerings which occur with Soma yajn~a, end always with an

offering to Agni Svis.t.akr.t, accompanied by the first, fourth and fifth verses of hymn RV 3.28. (A_pS'S 12.20.16; 13.1.13, 14; S'S'S 7.1.6; 17.2; 8.2.2). Dha_na_s are offered to Indra (RV 3.35.3,7; 3.52.7), a Karambha to Indra Pu_s.an.vat, a Payasya_ for Mitra-Varun.a and a Pariva_pa for Sarasvati_Bha_rati_. (MS 3.10.6 (137.6); S'Br 4.2.4.22; TBr 1.5.11). Comparable to dha_na_h offered, Yasna.XI.7 recalls the ancient observance: 'Swiftly may you cut from the flesh an offering (draonah) for the very strong Haoma'.

[This is a liturgy relatable to the process of creating a furnace pit in which the ore is subjected to the process of smelting or cupellation].

Hypothesis: **aya_sya a_n:girasa** is a meaningful compound which links 'soma' and 'metallurgical artifacts' and metal-workers of the Sarasvati-Sindhu civilization.

Additional foods such as Purod.a_s'as or Carus are offered along with Soma because they are necessary for 'holding the Soma'. (MS 3.10.5 (136.19): tasma_d anusavanam purod.a_s'ah pra_s'yah somapi_thasya dhr.tyai).

Flour is added to a Graha (Soma container), the Ha_riyojanagraha and Manthingraha. (RV 8.92.4: **apa_d u s'ipry andhasah indor indro yava_s'irah**). A part of the dha_nas -- the barley grains used in the yajn~a -- is husked, mixed with butter and added after the evening pressing to the Graha that is offered to Indra and his horses. (A_pS'S 13.17; La_t.ya_yana 2.11.10; TS 6.5.9.1). In all the three pressings the Manthingraha is drawn together with the S'ukragraha for the two demons S'an.d.a and Marka (i.e. death)...S'an.d.a and Marka are the priests of the Asuras. [cf. PW; MS 4.6.3 (81.1)]...marka is the same as Avestan mahrka and denotes 'death'. [cf. ma_raka ve_tai = killing of metals (Ta.)]

Late Harappan Period large burial urn with ledged rim for holding a bowl-shaped lid.

The painted panel around the shoulder of the vessel depicts flying peacocks with sun or star

motifs and wavy lines that may represent water. Cemetery H period, after 1900 BC. These new pottery styles seem to have been introduced at the very end of the Harappan Period. The transitional phase (Period 4) at Harappa has begun to yield richly diverse material remains

period suggesting a of considerable dynamism as socio-cultural traditions became realigned.



[Source: Kenoyer and Meadow; Slide 164 in: <http://www.harappa.com/indus2/index.html>]

A homonym 'maraka' denotes the 'peacock' depicted on the funerary pots of the civilization. TA_r (4.29; cf. MS 4.9.19 (136.1) has a verse: as'r.m.mukho rudhiren.a_bhyaktah yamasya du_tah s'vapa_d vi dha_vasi gr.dhrah suparn.ah kun.apam ni s.evase yamasya du_tah prahito bhavasya cobhaoh, '(You have a) bloody face; (you are) anointed with blood. As the messenger of Yama, you run around tearing. (You are an) eagle; (yet you) enjoy carrion. (You are) sent as messenger of both Yama and Bhava.' The gr.dhra (as yamasya du_ta, an inauspicious bird of death) is the demon Marka of the S'rauta ritual.

Soma is not drunk by mortals

With this background information on the locus of Rigvedic culture and the Sarasvati-Sindhu civilization, we can revisit the archaeological evidence and the textual evidence.

The Soma yajn~a is the soul of the Rigveda (a_tma_ yajn~asya: RV. IX. 2,10; 6,8). Linking with Indra, Soma is called in RV. IX.85,3 the 'soul (a_tma_) of Indra', the bolt (vajra) of Indra' (RV. IX.77,1) and even 'generator of Indra' (RV. IX.96.5).

somam manyate papiva_n yat sampim.s.anty os.adhim

RV 10.85.3: he thinks that he has drunk Soma when they trample the herb

What is Soma? Soma which was the 'soul' of the vedic sacrifice was put through three daily pressings, while worshipping all the gods. (Avesta Yasna X.2 mentions only two pressings). Soma/haoma literally means 'extract', from the root su – hu 'to press'. Scores of decipherments have been claimed as summarized by Harry Falk (Soma I and II, 1989, *BSOAS*, LII, Pt. 1, pp. 77-90). It would appear that a new interpretation is possible: Soma was electrum (gold-silver ore) which was purified in the pavitram to yield potable gold and silver after reducing and oxidizing the baser metals using ks.a_ra supplied by plants and using bones also as reducing agents. (Kalyanaraman, *Indian Alchemy: Soma in the Veda*, Delhi, Munshiram Manoharlal, in press). This metallurgical, allegorical interpretation is consistent with the decipherment of the script of the civilization revealed through over 3000 inscriptions on seals, tablets, copper tablets and on metallic weapons. The decipherment claims that the inscriptions are lists of bronze-brass-copper weapons produced by the fire- and metal-workers of the civilization. The dawn of bronze age in the civilization area is attested by many hundreds of artefacts of weapons and tools, apart from exquisite articles of jewellery using gold, silver, electrum, bronze, copper and artificial stones.

Soma is adored with all the 114 hymns of the ninth book of the Rigveda apart from 6 hymns in other books. He is also adored as a dual divinity with Indra, Agni, Pu_s.an or Rudra in 6 additional hymns. Soma as a word in its basic form and in compound form occurs hundreds of times in the Rigveda. "Judged by the standard of frequency, Soma therefore comes third in order of importance among the Vedic gods. Soma is much less anthropomorphic than Indra or Varun.a, the constant presence of the plant and its juice setting limits to the imagination of the poets who describe its personification. Consequently little is said of his human form or

action... Like other gods, he is, under the name of Indu as well as Soma, invoked to come to the sacrifice and receive the offerings on the strewn grass. The ninth book mainly consists of incantations sung over the tangible Soma while it is pressed by the stones, flows through the litter of grass to the gods as a beverage, sometimes in fire (I,94; 5,5; 8,43)...The processes to which it is subjected are overlaid with the most varied and chaotic imagery and with mystical fancies often incapable of certain interpretation." (A.A. Macdonell, *The Vedic Mythology*, Varanasi, Indological Book House, 1963, p. 104). This work supplies the references collated in the following two paragraphs.

A_s'vala_yana Gr.hya Su_tra (abbr. A_G, which belongs to the R.gveda) ed. K. Sa_mbas'ivaS'a_stri in the Trivandrum Sanskrit Series CXXXVIII (S'ri Citrodayaman~jari No.XXVII) 1938 includes a commentary in Sanskrit by S'ri Haradattamis'ra.

A_G1.5.4: **as.t.au pin.d.a_n kr.tva_ r.tam agre prathamam jajn~e, r.tesatyam pratisthitam yadiyam kuma_ry abhija_ta_tadiyam iha pratipadyata_m yat satyam tad dr.s'yata_m iti pin.d.a_n abhimantrya kukmari_m bru_ya_t es.a_m ekamgr.ha_n. eti:** He makes eight lumps of earth (taken from different places) and consecrates these lumps with the Mantra R.tam (the world-order ordained beforehand) was born in the beginning, the primeval. On R.ta is established Satya (Truth of conformity of events to this world-order); What this girl is born to that she may attain here. What the Truth is, may be seen! He then should say to the girl 'Pick up one of these'. [Vinayak Mahadev Apte, Non-R.gvedic mantras rubricated in the *A_s'vala_yana Gr.hya su_tra*: sources and interpretation, in: *New Indian Antiquary*, Vol. III, Nos. 2-7].

The terms **r.tasya yoni** (RV 9.64.11, 12); and **r.tasya dha_ra_** (RV 9.63.14, 21) -- may be translated as 'the home of the yajn~a', and 'stream of the yajn~a' respectively, indicating that the **r.ta** may be a synonym of the Vedic

altar of the Soma-receptacle. Soma is **r.tam br.hat**, the lofty yajn~a (RV 9.56.1).

NOTE: **R.ta** of the R.gveda becomes **as'a** in Avesta meaning, 'truth'. The A_G reference may point to the stage when Avestan broke off from the R.gvedic tradition; after the Gr.hya su_tra times... VS 11.47 explains: **r.tam satyam, r.tam satyam**; this mantra is recited while the lump of clay for the construction of the fire altar, is held above the goat (one of the victims of the ceremony). [The lump of clay can be explained in the context of the process of cementation, using salts, of the quartz containing the soma -- electrum to remove the impurities such as lead.

A_G1.3.10:

tad es.a_bhiyajn~a ga_theta_ gi_yate: pa_kayajn~a_nsama_sa_dyaika_jya_n ekabarhis.ahakasvis.t.akr.tah kurya_nna_na_pisati daivate:

In this connection, the following sacrificial ga_theta_ is sung. 'If one has (before one, the performance of different) pa_kayajn~as (at the same time), one should perform them with the same common A_jya, barhis and the same common Svis.t.akr.t (oblations), though the deity (of these pa_kayajn~as) may not be the same.'

NOTE: The use of the term 'ga_theta_' is significant and parallels the Avestan tradition of ga_theta_s, a clear indication of the chronology of the R.gvedic > Avestan traditions during the Su_tra times.

A_G 1.21.2 and 3:

samidham a_dha_ya_gnim upaspr.s'ya mukham nima_rs.t.i tristejasa_ma_samanajmi_ti tejasa_hyeva_tma_nam samankti_ti vijn~a_yate:

After putting the fuel (on the fire) and touching the fire (reverently), he wipes off his face three times (with the hand warmed up at the fire while it was touched) with the formula: I anoint myself with lustre, (for), it is known (from the

s'ruti). With lustre indeed, doe he anoint himself.

NOTE: Parallels with the Fire-Temple worship in the Avestan tradition are apparent. In the Vedic tradition, the yajn~a is brought into the context of the sam.ska_ras; in the Avestan tradition, the yasna is taken up to a religious plane.

The part of Soma which is pressed by Adhvaryu (RV. 8,4) is the am.s'u (lit. shoot or stalk). Soma is described as maujavata (RV. 10,34; lit. produced on Mount Mu_javat); also as dwelling in the mountains (giris.tha_) or growing in the mountains (parvata_vr.dh: RV. 9,46). In one figure of speech, Varun.a is stated to have placed soma on the rock (RV. 5,85) and in another, the eagle carries off soma from the rock (RV. 1,93). Terrestrial mountains are the abode of soma (RV. 9,2). Soma is the branch of a ruddy tree (RV. 10,94). It is the ruddy or tawny shoot which is pressed into the strainer (RV. 9,92). During pressing with ten reins (i.e. fingers: RV. 6,44), soma is figuratively placed in the heaven, the highest place of the cows (RV. 5,45); other figures of speech are purification with the hands (RV. 9,86), with ten fingers (RV. 9,8.15), by ten maiden sisters (RV. 9.1.6). Stone (adri; also, as'na, bharitra, parvata, parvata_ adrayah: RV. 8,2; 3,36; 3,35; 10,94.) is used to crush Soma (RV. 9,67; 9,107); pounding is the verb (RV. 10,85). The stones are on a skin ['chewed on the hide of the cow' (RV. 9,79)]. The stones are placed on the vedi or altar (RV. 5,31). Ten reins guide the crushing stones (RV. 10,94); ten fingers yoke the stone (RV. 5,43) and hence compared with horses (RV. 10,94).

[Rigveda uses the general technique of pressing using stones, though the process using mortar and pestle is known (RV. 1.28); this latter practice is used by Parsis. Avesta also states that Haoma grows on the mountains]

As a juice, Soma is called the rasa, fluid; and in one hymn it is pi_tu (lit. beverage). King Soma

when pressed is the am.r.ta (or somyam madhu or lit. soma mead (RV. 4,26; 6,20)). Very often, the figure of speech for soma is indu (lit. the bright drop). The drop is for Indra to drink (RV. 9,32.38). The seme, su (lit. to press) describes the extraction process of the rasa. Sometimes the seme, duh (lit. to milk) is used. The drops are poured through a strainer of sheep's wool (RV. 9,69) to remove impurity (RV. 9,78). The strainer is a skin (tvac), hair (roman), wool (va_ra), filter (pavitra), ridge (sa_nu or the top of the contrivance). These terms are used with or without an adjective formed from avi (sheep). The stage of passing through the strainer is called pavama_na or puna_na (from seme, pu: lit. flowing clear). The unmixed, purified soma is offered exclusively to va_yu and Indra (va_yu is adored with the epithet: s'ucipa_: drinking clear (soma). As the juice flows, the comparison is with the 'wave of a stream' (RV. 9,80) or just a wave (RV. 9,64). As the juice accumulates in the vat (kalas'a: RV. 9,60), it is compared to a sea (arn.ava: RV. 10,115) or a samudraa (RV. 5,47; 9,64). As water is poured to mix with the rasa, the stalk roars (RV. 9,74). "Like a bull on the herd, he rushes on the vat, into the lap of the waters, a roaring bull; clothing himself in waters, Indu rushes around the vat, impelled by the singers (RV. 9,76.107)." The roar is likened to the roar of a bull ('As a bull he bellows in the wood (RV. 9,7). Soma is brilliant and coloured yellow and hence compared with the rays of the sun (RV. 9,76.86). Gods drink him for immortality (RV. 9,106); soma confers immortality on gods (RV. 1,91; 9,108) and on men (RV. 1,91; 8,48) gods love the amr.ta (RV. 9,85); all the gods drink soma (RV. 9,109); all the gods become exhilarated (RV. 8,58); soma is immortal (RV. 1,43; 8,48; 9,3). Soma strengthens Indra in his conflict with the hostile powers of the air, with Vr.tra (RV. 8,81); soma becomes the thousand-winning bolt (RV. 9,47), wins a hundred forts (RV. 9,48). Soma is a treasure (rayi: RV. 9,48). Soma is a god pressed for the gods (RV. 9,3).

In the early stages of the use of Soma, mythology was not the dominant characteristic; it was simply a product which had to be processed. (See also Falk, Harry, *Soma I and II*, 1989, BSOAS, LII, Pt. 1, pp. 77-90; Falk analyses Soma as a plant and concludes that it was ephedra, used as a stimulant). In the context of the poetics of the Rigveda which abounds in allegories, puns and metaphors, it is hypothesised that only Soma, and Soma alone was a product refined using Agni; all the other references to gods are poetic degrees of freedom to invoke gods into artefacts used in the processing of Soma. Perhaps, even Indra was relatable to the lexeme: indh (semant. firewood or charcoal):

i~dhaur.a_ = room for storing wood (H.);
idho_n = tripod to put over the fire (Kal.);
indhana = fuel (Pali); e~_date = fireplace (Wg.);
saminddhe_ = sets fire to, takes fire;
samiddha = ignited; samidh = fuel (RV.);
samidha_ = fuel (Pali); samiha_ = fuel (Pkt.);
su~dhkan.a_ = to be kindled (P.); negad.i = large fire lighted for warmth in cold weather or to keep off wild beasts (Te.);
iruntai, iruntu, iruntil = charcoal (Ta.); cirun = charcoal (Pa.);
sindi = soot (Kol.); sirin (pl. sirnil) = charcoal, cinders (Ga.);
irk, sirik = charcoal (Go.); ri_ka, ri_nga = charcoal (Pe.);
si_nga = charcoal (Kui); ri_nga, ri_ngla charcoal (Kuwi)

Gernot L. Windfuhr, [Haoma/Soma: the plant, in: *Acta Iranica* 25 (= Papers in Honour of Professor Mary Boyce, Hommages et Opera Minora, 11) (Leiden, 1985), 699-726, see pp. 703, 707] has pointed out that Soma was neither hallucinogenic nor intoxicant and proceeds to identify Soma as ginseng, a root used as a stimulant. The identification of Soma as a root is questionable because ginseng has no component to connote am.s'u/asu.

RV 10.34.1 states: Somasyeva maujavatasya bhaks.o vibhi_dako ja_gr.vir mahyam accha_n (an alerting eatable or food from mount mu_javat). Soma keeps Indra awake (vivyaktha mahina_ vr.s.an bhaks.am. Somasya ja_gr.ve

(RV. 8.92.23). Soma is the inspirer or vipra of Angiras (RV. 9.107.6). [cf. an:ga_ra = glowing charcoal (RV.); angar id. (Gypsy). in:gha_l.a = growing embers (Pali); i~gal., i~gl.a_ charcoal-burner (M.); aggi = fire (Te.)] In the context of processing (refining or purifying or smelting) Soma (electrum ore or quartz), charcoal is a vital component; since charcoal combines with the baser metals and oxidizes them leaving the residual potable, gold-silver compound which is electrum. When Soma is referred to as indrapi_ta or 'drunk by Indra (indav indrapi_tasya) (PB 1.5.4), the reference is indeed to the reducing action of glowing charcoal embers during the process of smelting the electrum ore. Naturally, Indra received the major share of Soma. (RV. I.2,3; II.41 indicate the sequence of offerings of Soma: va_yu, indra-va_yu, mitra-varun.a, as'vins, indra, vis've deva_h, Sarasvati_.) Thus, Indra, as the chief partaker of Soma, is linked with Soma from the mountains (the ore) and some on the earth (ground in pressing-stones): 'May heavenly drink exhilarate thee, Indra, and also what is pressed in earthly places'. (RV. X. 116,3).

RV. X. 85,3 refers to the Soma known only to the brahmins; this is an early indication of the mystery or secret doctrine that would surround the Soma pressing process in later-day texts. The nature of Soma would be mystified in later texts by references to the moon (the colour of silver component of electrum). Tamil tradition has it in a lexeme: co_ma man.al = sand containing silver ore. (Winslow's lexicon).

The water element is the potable metal; Vr.tra withheld the waters. Indra frees the waters. Soma is described as having 'hanging branches bending down' (naica_s'a_kha: RV. III.53,14) It is not necessary to interpret the term 'ti_vra' (sharp) in the context of taste; ti_vra connotes the sharpness of the metallic components of the ore blocks. a~_su = fibrous layer at root of coconut branches, edge or prickles of leaves; a~_s = fibre, pith (Or.); a~_si~_ fine particles of flattened rice in winnowing fan (M.); these

lexemes provide a semantic lead to the am.s'u/asu used to describe Soma; the term connotes the streaks of metal, seen like fibres of a stringy fruit or nap of cloth [a~_s (B.)]. The am.s'u was ruddy (RV. VII.98,1). The RV reference to Soma 'growing' on the mountains (giris.t.ha_) is explained in the context of the ores obtained from the mines in NW India. (giris.t.ha: RV. III.48,2; V.43,4; IX.18,1, 62,4; parvata_vr.dh: RV. IX.46,1) Hence, the reference to Somam adrau (RV. 5.85,2) plucked in two rocks. The colour of the Soma filaments contained in the ore block are 'reddish' or 'yellow' (arun.a/arus.a or hari/za_iri). Za_iri = golden-hued (Yasna IX.16,30). RV. 10.97,18, 19 refer to the group of herbs having Soma as their king (Somara_jn~ih); the growth of herbs on the mountains is the obvious reference here. 'Ma_taris'van fetched one of you (Agni and Soma) from heaven; the eagle twirled the other from the cloud-rock'. (RV. I.93,6). The links of Soma with rocks are vivid. (adri: RV. V.85,2; I.93,6)[See Bloomfield, *The Legend of Soma and the Eagle*, JAOS, 16, 1896, pp. 1-24]. 'High is the birth of thee, the plant; thee being in heaven the earth received'. (RV. IX. 61,10). Yasna (X.4,10-12,17) places haoma on the high mountain haraiti; it is placed there by a skilful god, wherefrom holy birds carried it everywhere to the heights. Rigveda connects Soma with the mount Mu_javant: 'As draught of Maujavata Soma, so doth, the enlivening vibhi_daka delight me' (RV. X.34,1). Griswold notes: 'The mountain Mu_javant (if it was a mountain and not simply the name of a people), being closely connected with the Gandha_ris (AV. V.22,5,7,8,14) must have been situated somewhere between Bactria and the Punjab. In the Tait. Samh. I. 8,6,2 and the AV. Passages referred to above the Mu_javants are taken as a type of distant folk, to which Rudra with his fever-bearing bow is entreated to depart. In fact Mu_javant is as far off and mysterious as the river rasa_. Possibly both embody dim reminiscences of the undivided Indo-Iranian days.' (p. 217). Soma flourished during the rainy season, swelling with milk (RV. II.13,1), strengthened by the rain-cloud, parjanya (RV.

IX.82,3; 113,3). Yasna (X.3): 'I praise the cloud and the waters that made thy body to grow upon the mountains.' Later rituals state that Soma had to be purchased from a s'u_dra, who was a trader in Soma who was like the gandharva who held back the celestial Soma. (cf. ks.udraka = maker of minute beads or minor work in gold (Arthas'a_stra: 2.13.37 and 40). There is a reference to ki_kat.as in the context of the sacrifice: 'Amid ki_kat.as what do thy kine, O Indra? That tribe nor mixture (a_sir or milk for mixing with Soma) pours nor heats oblation; bear thou to us the wealth of pramaganda, give up, O Maghavan, to us the 'low-branched'. (RV. III.53,14). Regarding the ritual purchase of the Soma, TS. 6,1,6,7 states that one buys the Soma with a ruddy, yellow-eyed cow; 'this, one should know, is the form of Soma: then one buys it with its own deity. That became gold... Those who discourse on brahman say, 'how is it that offspring are produced through that which is boneless, and yet are born with bones?' Because one offers the gold, placing it in the ghee, therefore offspring are born... with bones.'

Avesta shows that Haoma is connected with the mountain Haraiti. (Yasna 10.4, 10-12,17: Haoma is placed on the high mountain Haraiti by a skilful god, whence holy birds carried it everywhere to the heights, where it grew both on the lofty tablelands and in the mountain valleys). (cf. H.D. Griswold, 1971, *The Religion of the Rigveda*, Delhi, Motilal Banaridass, p.217)

In the tradition of the Black Yajurveda, A_pS'. 10,25,11 states that the adhvaryu should buy the Soma with gold saying: " I buy the bright (s'ukra, Soma) with bright (gold), the glittering (candra) with glittering, the amr.tam with amr.tam to match thy cow" (TS. 1,2,7,1); the Soma-dealer answers: "King Soma deserves more than that". Adhvaryu washes king Soma with water and unfolds him (A_pA'. 11,1,11). "Every shoot of thee, O Soma, must swell for Indra..." (TS. 1,2,11,1). The purpose of the yajn~a is: ' by means of ghee as the vajra and

two sacrificial ladles as their arms the gods slew Vr.tra. Vr.tra is the Soma. One should know that they slay Soma, when they sacrifice with ghee in his presence. By means of these mantras one makes Soma swell again." (TS. 6,2,2,4)

The Avestan references to Haoma as a plant can be explained as a ritualistic representation of the Soma refining process of the earlier days on the banks of the Sarasvati river. Yasna refers to the scent of the plant (Yasna, 10,4) but RV does not. There is, however, reference to the intense smell of the type common in the workshop of a metalsmith who uses ks.a_ra (plant-based alkalis) to oxidise the impurities or baser metals in an ore block. Griswold notes that there are only two references to haoma in the Ga_tha_s of Zoroaster, one mentioning du_raos'a 'the averter of death' (Yasna, XXXII.14), the standing epithet of haoma in the later Avesta, and the other alluding to 'the filthiness of this intoxicant' (Yasna, XLVIII.10). These allusions are sufficient to prove that the intoxicating haoma was under the ban of the great reformer (H.D. Griswold, 1923, *The Religion of the Rigveda*, London, Oxford University Press, p. 14).

Ho_m of three kinds

It should be noted, at the outset, that the Iranian haoma hymns, treating haoma as sacred, are in the Younger Avestan language, in which texts continued to be composed in the Hellenistic period, and perhaps even later. (David Stophlet Flattery and Martin Schwartz, 1989, *Haoma and Harmaline: The botanical identity of the Indo-Iranian sacred hallucinogen 'Soma' and its legacy in religion, language, and middle eastern folklore*, Berkeley, Univ. of California Press, p. 10, n. 10).

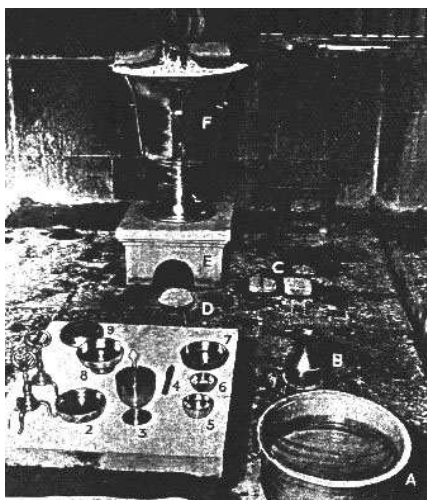
The chief Zoroastrian sacrament is the consecration of haoma. The yazata of plants, Haoma tends to be assimilated to Amereta_t, yazata_ of Immortality and protector of plants. Amereta_t (Amurda_d), like the White Ho_m

is: 'the chief of plants; the for the plants of the world belong to her, and she makes plants grow and increase flocks of animals, because all creatures eat and live by her'. (GBd. XXVI 113). 'Gathic' Amereta_t replaced the ancient Haoma. (cf. L.H. Gray, *The foundations of the Iranian religions*, in: *Journal of the K.R. Cama Oriental Institute*, XV, 1929).

Haoma is a priest of the sacrifice; his name is derived from the sacred plant. Haoma, the priest, makes the offering of consecrated haoma to the other gods: Haoma 'was the first to offer up the haomas with a star-adorned, spirit-fashioned mortar upon high Haraiti_.' (Yt.X.90). Identified as an ephedra, the plant grows on the mountains of Central Asia and Persia. (See G. Watt, *Dictionary of the Economic Products of India*, III, 246-7: 'In India one species only can be said to occur throughout the Himalaya, viz. *Ephedra vulgaris*, Rich. (= E. Gerardiana, Wall.); but this is also distributed to Central and Western Asia and to Europe. The other two Indian species have a more easterly distribution, the one extending from Garhwal to Afghanistan and Persia (E. Pachyclada, Boiss.) and the other being met with in the Punjab, Rajputana, Sind, and distributed to Afghanistan and Syria (E. peduncularis, Boiss.).' Mary Boyce notes that E. Pachyclada, Boiss. is called *hum*, *huma*, *yehma* in the Hari-Rud valley. Haoma is pressed and consecrated in the Yasna sacrifice; the yazata urges Zoroaster: 'Gather me, O Spitama, press me for drink, praise me for strength!' (Y.IX.2 as translated by W.B. Henning). In *De_nkard* (Dk.VIII.3.29f.--Sanjana, Vol. XIV), Zoroaster consecrates haoma to be drunk by the bull of a righteous man, whereby the animal was cured of sickness. The consecrated haoma which gives spiritual strength on earth is the symbol of the mythological White Ho_m, also called the Go_karn Tree, which grows in the waters, at the source of Aredvi_ Su_ra_. (Vd. XX.r; Zsprm.XXXV.15; GBd.XVI.4; MX.LXII.28-30; she is ana_hito_, that is, immaculate: Yt.X.88). Haoma 'derives its contentment from the a_bzo_hr', that is, from the libation of

consecrated haoma to the waters. 'The well-grown ho_m...is the symbol of that White Ho_m of the Go_karn, from which (will be) manifest the immortality of Fras'egird'. (Dd., Purs. 47.16--PKA.98.17-20). This White Ho_m, the 'pain-dispelling Tree', has more power of healing than any other plant; for through it 'the dead will become living, and the living immortal', when they partake of it at the final yasna of Fras'egird.. Haoma is the chief of all plants, urwara_n rad. (GBd. VIe,4). There is explicit reference to 'Ho_m Yazad who is in the Go_karn'. (GBd.XXVI.93: Ho_m Yazad i_andar go_karn). Based on these reference, Mary Boyce concludes: 'It seems possible, therefore, that the "ho_m of three kinds" which is said in the same Bundahis'n chapter belong to Ho_m Yazad may consist of the natural ho_m, the consecrated ho_m, and the mythological White Ho_m.'

"There appear to have been two separate rites in



was sacrificed before the service took place and its flesh was roasted to provide go_s'oda_g for the ca_s'ni_ during Ha_ VIII. The zo_hr of fat to the sacred Fire was offered at the same time. This oblation was made by the assisting priest called the fraberetar or frabarta_r, who left the enclosure of the yasna to carry it to the Fire." Y.XI.7 recalls the ancient observance: 'Swiftly may you cut from the flesh an offering (draonah) for the very strong Haoma'.

(Mary Boyce, Haoma, priest of the sacrifice, in: *W. B. Henning Memorial Volume*, 1970, London, Lund Humphries, pp. 62-80).

The points to be noted from these notes of Mary Boyce are:

River Sarasvati_ (Aredvi_ Su_ra_ Ana_hita_) was associated with Haoma

The functions of the priests, Haoma and Frabarta_r, were delineated during the consecration of Haoma. The names and functions of the priests are comparable to Hotr. and Pratiprastha_ta_ of the Bra_hman.a period. The R.gveda does not identify nor delineate the functions of a set of priests, pointing to the possibility that the processes detailed in the R.gveda ante-date the reference to Haoma in the Avestan tradition. "A_pastamba has prescribed the Hotr.'s duties in connection with the New-moon and the Full-moon sacrifices in A_pS'S. XXIV.11-14, and at the end he says that the remaining duties of the Hotr. in connection with the New-moon and the Full-moon sacrifices have been prescribed along with the Adhvaryu's duties in that connection, and that his other duties (in connection with the modification-sacrifices) should be taken from the R.gveda...The tradition of adopting the R.g-hautra throughout by a Taittiri_ya seems to have been originated probably from the fact that a Taittiri_ya had to resort to R.gveda for the Hautra at the Soma-sacrifice--the most significant part of the Vedic rituals. What was to be taken for the Soma-sacrifice was accepted for other rituals also. According to Baudha_yana (BS'S II.4), all the sixteen officiating priests are to be formally chosen by the sacrificer at the setting up of the sacred fires itself. It was, therefore, natural that the sacrificer chose the Hotr. belonging to the R.gveda in view of his requirements at a Soma-sacrifice." (C.G. Kashikar, 1964, *The Vedic sacrificial rituals through the ages*, in: *Indian Antiquary*, Vol. 1, No.2, Bombay, Popular Prakashan, p.88)

Yasna ceremony: apparatus and implements used as they appear in the Stage of Ha_ 27; Explanatory notes: The seat of the Chief Priest (Zo_t) is not shown; it is behind the work-table on a raised platform; A. Reservoir of consecrated water: zor; the vessel is called Kundi; B. A pitcher of water on a stand; it serves to wash the hands of either of the two priests Zo_t and ra_spi_, whenever necessary; C. Two blocks of marble over which sandalwood chips and incense are placed, later to be deposited on the Altar-Fire; D. Dish containing sacred bread (Darun); this is already consecrated at the stage of the 8th Ha_, when it was on a work-table; E. The throne (xva_n) of the Sacred Fire (Dadga_h) which is solemnly washed at the beginning of the 1st Ha_ by the Zo_t; symbolically, the rite resembles washing the feet of the Deity to be installed on the altar; F. The Fire-Censer; the fire is fed with wood and incense; the stool near the window is the Ra_spi's seat, though he has often to leave his place to carry out functions assigned to him; the ledge of the window has stock of sandalwood-chips, also tongs and ladle; G. The Nitche (Ta_kh) contains an oil-lamp, a box of Haoma-twigs and reserve stock of Para-Haoma; the work-table proper which is of marble is so arranged as would show the position of apparatus at Ha_ 27. (1) The pair of tripod stands with crescent-shaped tops (known as Ma_h-rue moon-shaped). Between the two poles is laid the Beresma-bunch of wires. This bunch is tied with a girdle made of palm-leaf strand known as Aivyaonghan. This girdle keeps the bunch of 21 wires together and at the same time connects the bunch with one of the horns of the Ma_hrue facing the Fire; one of such wires is deposited between the tripod lower legs; (2) Saucer containing milk in sacred water known as ji_va_m; another wire is placed over this saucer; (3) The mortar (Ha_vani) and Pestle (Lala) used for pounding pomegranate (urvara_m) twigs along with Haoma-twigs to prepare the extract for sacrament; the pestle is also used for tolling bell-like sounds (a) to exorcize (snatha_yi) evil influences and (b) to proclaim the victory of Divine elements as

against our lower nature; (4) The knife (Kapla) used for preparing the girdle of the Beresma and also for cutting twigs from the pomegranate tree and a blade from the palm-leaf, before the ceremony at the Para-Yasna stage; (5) Contains water consecrated (Zaothra); (6) Contains Ring-condenser (Varesa-angushtri) immersed in water; the bull's hair and ring are not shown; (7) Saucer used to take water out of the kundi; (8) The cup containing consecrated Haoma-sacrament is below the saucer with nine holes (Sura_khda_r-Tashta); this saucer is a sort of filter for refining Haoma-extract poured from the mortar; (9) The covered cup containing Para-Haoma reserve of sacred Haoma-juice. (Source: Diagram 1 in: Lawrence Mills, 1910, *The Yasna of the Avesta*, Leipzig, FA Brockhaus).

Soma substitutes for the original Peganum harmala: Amanita muscaria, Ephedra vulgaris, Sarcostemma brevistigma

Ephedra is called soma, som, sumanai, asmania, amsania, asminabuti_ and somalata_ in Dardic and Indic languages. Avestan barezis., baresman (Zoroastrian barsom; Persian ba_lis. meaning 'cushion') are strewn than held in the hand; this is cognate with Vedic barhis. An important part of some Zoroastrian rituals is the tying of the barsom twigs into a bundle. The lexemes may simply refer to woody twigs.

RV 4.18.13: **apas'yam ja_ya_m amahi_yama_na_m adha_me s'yeno madhv a_jabha_ra, 'I saw the woman in distress; then the eagle brought me the Madhu,'** (says Indra).

RV 10.116.3: mamattu tva_ divyah soma indra mamattu yah su_yate pa_rthives.u, 'Let the celestial Soma intoxicate you, Indra, let that intoxicate you which men press'. "Spiegel is not wrong when he maintains (*Arische Periode*, p. 177) that there was little mention of the intoxication of the singers and priests...these hymns, after all, occupy themselves more with gods than with men...Indra drank pure Soma

which pressed forward again through all the openings of his body so that the gods had to cure him by means of the Sautra_man.i_ ceremony which was intended for this pvery purpose by the Bra_hman.as' (cf. Av 3.3.2; TS 2.3.2; S'Br 5.5.4.9 ff.; 12.7.1.11). [Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, p184].

"...*sauma-, the form which must be reconstructed for the Proto-Indo-Iranian ancestral language, merely denoted a 'pressed out (liquid or plant)...early on came to be used as a common name for a secondary plant (namely, Ephedra)...R.Gordon Wasson's *Soma: Divine Mushroom of Immortality* (1968)...where it is argued that soma was the fly-agaric or *Amanita muscaria*, a hallucinogenic mushroom consumed until recently for intoxication by peoples in Siberia. Wasson (1971: 171) states that the following four points respecting the R.gveda lead him to equate soma with *Amanita muscaria*: (1) there is no mention of the roots or branches or blossoms or seed of soma; (2) the poets locate the plant high in the mountains (and *A. muscaria* may be the one psychotropic plant which can only be found at high elevations in the Indo-Iranian area); (3) there appears in the hymns 'a succession of tropes each appropriate for the fly-agaric, indeed fitting it like a glove'; and (4) 'no word in the R.gveda is inconsistent with this plant'...the soma referred to in the R.gveda and adduced by Wasson as pertaining to the mushroom is the liquid extract (soma pavama_na) or the deity Soma, and hence not the soma plant at all...While soma in the R.gveda (and haoma in the Avesta) is indeed repeatedly said to grow in the mountains, it may be questioned whether these passages were intended to locate the plant physiographically, to indicate that it grew wild, or merely to assert its lofty origins...Ambiguity pervades virtually all of the complex metaphors and similes associated with soma in the R.gveda...Wasson attempted to find a plant that would provide a

material basis for a widely assumed theory, namely, that the soma hymns of the Ninth Book of the R.gveda reflect direct experience of the drug, and that, as the hymns imply, soma was consumed in order to experience ecstasy, but that not long after the hymns were composed, the original plant ceased to be available, for which reason it was replaced in the ceremonies by nonintoxicating substitutes...In the R.gveda soma is represented as an offering, made above all to Indra, who is said to depend upon it for his strength. The concept of the extract as an offering to be drunk by the gods, however, is not found in the Iranian texts, and must have emerged in India at a time when the extract no longer had the purpose of intoxicating the priests who consumed it. Because an extensive mythology associated with this apparent rationalization of the ritual presence of soma had already developed, it may be supposed that the use of the intoxicating plant had vanished from the usual ceremonies long before the final fixation of the R.ksam.hita_ as we have it. [David Stophlet Flattery and Martin Schwartz, 1989, *Haoma and Harmaline: The botanical identity of the Indo-Iranian sacred hallucinogen 'Soma' and its legacy in religion, language, and middle eastern folklore*, Berkeley, Univ. of California Press; See John Brough, 1971, Soma and *Amanita Muscaria*, *Bulletin of the School of Oriental and African Studies* 34, 331-362; Problems of the 'soma-mushroom' theory, *Indologica Taurinensia* 1, 21-32; Rahul Peter Das, 1987, On the identification of a Vedic plant, *Studies on Indian Medical History*, papers presented at the International Workshop on the Study of Indian Medicine held at the Wellcome Institute for the History of Medicine 2-4 September 1985. Ed. by G. Jan Meulenbeld and Dominik Wujastyk. Groningen, 19-42; O'Flaherty, W.D., 1968, The Post-Vedic history of the soma plant, in: R.G. Wasson, *Soma: divine mushroom of immortality*, New York, Part II (95-147); Muller, R.E.G., 1954, Soma in der altindische Heilkunde, in: *Asiatica, Festschrift Friedrich Weller zum 65. Geburtstag gewidmet vom*

seinen Freunden, Kollegen und Schülern. Leipzig, 428-44].

The entire edifice of identification of soma as an 'intoxicant' is built up on the assumption that the Vedic texts do refer to the 'ecstasy' generated by drinking soma juice. The 'ecstasy' may be an exaggeration by the Vedic poets; in the Atharvaveda even the remains of the sacrifice (4.34.35; 11.1.25), the odana (porridge) can produce 'ecstasy' (Keith 1925: I, 275). Since the Soma was prepared freshly three times a day, in three savanas, there could have been hardly enough time for the fermentation to occur to make it an intoxicant. "...the use of Ephedra in present day Iranian haoma rituals was probably paralleled by the use of Ephedra in the soma rites of the north Indian Vedic schools, which endured until the tenth century Islamic invasions of north India. Today soma rites are rare and are found only in south India, where schools of Vedic priests were to some extent reestablished by refugees from these invasions. The plant which reports uniformly indicate to be used as soma in these south Indian rites is an asclepiadaceous, leafless climber, *Sarcostemma brevistigma* Wight & Arn. (Synonyms include: *Asclepias acida* Roxb., *Sarcostemma acidum* Voigt., and *Sarcostemma viminalis* Wall. ex Decne. A.C. Burnell (1878: viii n.), states that, while *Sarcostemma* was used for soma on the east coast of India, on the west coast two species of *Ceropegia*, '*C. Decaisneana*' and '*C. Elegans*' were used, but he does not say how he knew of the ritual use of these species. The two *Ceropegias* are also asclepiadaceous vines and probably merely substitute for *Sarcostemma brevistigma* in local rites). The twigs of *Sarcostemma brevistigma* contain a milky sap, but when dry they may be difficult to distinguish from Ephedra stems. *Sarcostemma* are tropical species and could not have been available for use as soma in Vedic times because they are absent from the flora of north India, and must therefore have been adopted only when, long after the Vedic period, Brahman priests emigrated to south India. These priests must have then selected

Sarcostemma to substitute for the plant traditionally used as soma in north India. Ephedra species do not seem to occur in south India, nor in fact near the ritual centers of the northern plains themselves, so, to have been used there during the many centuries of Vedic practices, they would have to have been imported from adjacent uplands to the north and northwest. (Note: The importance of soma plants is reflected in the ritual enactment of the purchase of a cart of soma plants described in *S'atapatha Brahmana* 3.3.1.1. f (see Hillebrandt 1980: 160-167; Dandekar 1973: II, 112-144; Kashikar 1964: 270-277; and Staal 1979). That it was Ephedra which *Sarcostemma* replaced as soma is evidenced by the fact that in Nepal today Ephedra is called by the Sanskrit name *somalata* 'soma creeper' (Singh 1979; Shreshtha 1979; Manandhar 1980). The Islamic invasions resulted in the flight of Hindu refugees both to south India and to Nepal. Although these refugees do not appear to have established Vedic rites in Nepal, they introduced the Sanskrit language there. Sanskrit names for plants in Nepal date from the arrival of these refugees (J.F. Staal)...Some of the Ephedra species known by names reflecting haoma/soma contain, in quantities conditioned by rainfall and season, ephedrine, a sympathomimetic alkaloid somewhat similar in physiological action to adrenaline...Ephedra is unknown in traditional Indic or Iranian folk medicine, while in China, where it has been recognized for many centuries as a medicine, it is not regarded as intoxicating and its consumption lacks ceremonial or religious associations. The clearest demonstration that Ephedra cannot have been soma exists in the very fact that Ephedra extracts are today drunk as haoma by Zoroastrian priests who do not become intoxicated from them...*Peganum harmala* is a commonplace weed without significant economic value, as compared with other Iranian plants, and in general unremarkable, except in the one respect that it alone among Iranian plants contains the visionary drugs harmaline and harmine. This property is not exploited today, but because it is

th sole significant distinctive feature of harmel, the only way the plant could have acquired sanctity among all Iranian peoples was for these drugs to have been used and for their effects to have been widely experienced and esteemed." [David Stophlet Flattery and Martin Schwartz, 1989, *Haoma and Harmaline: The botanical identity of the Indo-Iranian sacred hallucinogen 'Soma' and its legacy in religion, language, and middle eastern folklore*, Berkeley, Univ. of California Press]. "In Margiana, Sarianidi has discovered vessels which chemical analysis has shown to contain organic remains of Ephedra. They came from temple-like buildings at Togolok-21 and Gonur-1, with white-plastered rooms having platforms along walls with sunk-in vessels, and adjoining rooms having ceramic stands and sieves...At Gonur-1 the ritualistic vessels also contained remains of poppy and cannabis, at Togolok-21 traces of poppy were found on stone mortars and pestles (Sarianidi 1987; Sarianidi 1990: 102 ff.; Sarianidi 1993, 8; Sarianidi 1993; Kusove 1993)...if the Margiana temples and their vessels date to the BMAC period (ca. 1900-1700 BC) and if the vessels contain remains of Ephedra, we may assume that the Dasas of Margiana did in fact press Soma, and that they had introduced the cult from the early phases of the Andronovo (i.e. Petrovka) culture." (Asko Parpola, 1995, *The problem of the Aryans and the Soma: Textual-linguistic and archaeological evidence*, in: George Erdosy, ed., *The Indo-Aryans of Ancient South Asia*, Berlin, Walter de Gruyter & Co., p. 371) [Note: Hari Nyberg, 1995, *The problem of the Aryans and the Soma: the botanical evidence*, p. 401, *ibid.*, notes that the evidence from the Togolok 21 finds are not conclusive: 'In 1991, I received some samples from the site, which were subjected to pollen analysis at the Department of Botany, University of Helsinki. However, upon analysis, it was evident that most of the pollen in the samples had been destroyed...in most cases only pollen of the family Caryophyllaceae was found, along with some pollen remains from the families Chenopodiaceae and Poaceae

(grain crops?)...No pollen from ephedras or poppies was found...Thus, further archaeological investigations are necessary to add weight to the existing, but scarce, archaeological evidence for the early use of ephedras.']

Haug in *Goettingische Gelehrte Anzeigen* 1875, p. 568: 'The Soma plant is not a mere plant, but a creeping and somewhat twisting semi-shrub with a series of leafless shoots which contain an acidulous milky juice. Its present botanical name is *Sarcostemma intermedium* (de Candolle, *Prodromus*, p. 538). It grows everywhere in India. *Sarcostemma brevistigma* and *S. brunonianum* are closest to it (*ibid.*). In *Icones plantarum Indiae orientalis*, vol. IV, No. 1281, R. Wight gives an illustration of it which should be compared with the text on p. 17."

Even assuming, for the sake of argument, that Sarianidi was right in identifying twigs of ephedra at Togolok-21, the haoma process is related to the processing of a plant which is clearly a substitute for the soma of Rgvedic times. "...on a plot specially reserved for them, there were found two brick-faced altars dug into the earth. The smaller flat-bottomed one contained a half-metre layer of compressed ashes. The larger, deeply cut conic one had a shallow hearth in the centre of the bottom with remnants of coals. The smaller altar was dedicated to fire, while the larger one was used for ritual libations, as evidenced by a large stain on its wall...What the Togolok-21 complex was used for was established by finds in one of the premises, along the walls of which there was a row of vessels placed inside special brick platforms. The organic remains from them, as Prof. N. Meier-Melikayan from the Moscow State University established, contained microscopic twigs of ephedra... the temple served chiefly for ritual libations (as a temple of fire it was of secondary importance). The central, obviously sacred part (the citadel) of this multicomponent complex was used to brew haoma; both altars were outside it. The priests took the drink, poured it into the vessels which were carried to the altar where the libations took place." (Sarianidi, Victor I., 1987, *South-west Asia: Migrations, the Aryans and Zoroastrians*.

International Association for the Study of Cultures of Central Asia, Information Bulletin 13: 44-56. Moscow: 48-51).

In Bharat, during the period of the Bra_hman.a-s, plants as *soma* substitutes had been used in yajn~a. Thus, BMAC evidence from Togolok-21 should be dated as post-R.gvedic.

These arguments to identify anyone of the plant varieties as soma are based on the supposition that some type of ecstasy has to be induced the juice of the plant, assuming that the R.gveda does indicate that the imbibing the juice results in intoxication, hallucination or ecstasy. The Avestan term mada (root mad-) with cognate words in Indic, is a reference to the effects of haoma and the context of 'intoxication' is restricted to the Yasna 9-11 (i.e. the Ho_m Yasht): Y 10.8: a_at ho_ yo_ haomahe mado_ (the intoxication of Haoma is accompanied by bliss-bringing Rightness); Y 10.14: fras.a frayantau te_ mado_ (May thy intodicans come forth clearly); Y 10.19: raoxs.na frayantu te_ mado_ (they intoxications come forth to me (clearly); Y 11.10: twaxs.a_i haomahe mada_i (for the active intoxication of Haoma for well being, for Rightness)-- these references seem to refer to 'intoxication' conjointly with references to 'Rightness' -- as.a. Yasna 10.14 Avestan mado_ is translated me_nis.n 'thinking'; and in Yasna 11.10 Avestan mada_i is not translated at all in the Middle Persian (Pahlavi) translations of the Avestan passages.

arthavantah s'abdasa_ma_nya_t, 'vedic stanzas are significant because (their) words identical (with those of the spoken language)'. (Niruktam 1.16)

gobhih s'ri_n.i_ti matsaram (Niruktam 2.4): 'The word gauh is a synonym of 'earth'...Matsarah means soma; it is derived from (the root) mand meaning to satisfy. Matsarah is a synonym of greed also; it makes man mad after wealth. Payas (milk) is derived from (the root) pa_ (to drink), or from pya_y (to swell)... -- matsara iti lobhana_ma, abhimatta enena dhanam bhavati, payah pivaterva_

pya_yaterva_'. (Lakshman Sarup, 1920, *The Nighan.t.u and the Nirukta*, Delhi, Motilal Banarsidass, p.24)

According to Durga, synonyms of gold follow those of the earth, because gold, being found in earth, is intimately associated with it. 'The following fifteen (words) are synonyms of gold. From what (root) is hiran.yam derived? It is circulated (hriyate) in a stretched form, or it is circulated from man to man (tena hi vyavaha_rah kriyate), or it is useful and delightful, (or it is the delight of the heart), or it may be derived from (the root) hary, meaning to yearn after.' (Niruktam 2.10).

Adrih (thunderbolt) is (so called because) with it he splits (mountains), or it may be derived from (the root) ad (to eat). It is well known: they are eaters of soma. The word ra_dhas is a synonym of wealth: with it, they conciliate. Bring that wealth to us, O Lord to whom treasures are known, with both thy hands. Let both thy hands be full...may we, with an active mind, partake of thy pressed soma, as if it were paternal property' (Nir. 4.4, 6):

**adrivan adrira_dr.n.a_tyenena api va_tteh
sya_t te soma_do itiha vijn~a_yate;ra_dha iti
dhanana_ma;ra_ghnuvantyanena;
tannastvam vittadhanobha_gya_m
hasta_bhya_ma_hara;ubhau samubdhau
bhavatah...te manasa_sutasya bhaks.i_mahi
pitr.yasyeva dhanasya.**

The essential part of the a_tas.-zo_hr (the zaotra to the Waters) is the fat of a sacrificial animal. (Boyce 1966). The use of ghr.ta or animal fat can be explained as necessary to attain the temperature required to achieve oxidation of baser metals from a compound quartz such as electrum.

"In the translations of Vi_sperad 8.1 and apparently Ne_rangista_n 30, the Pahlavi glosses in m'd- are interpreted as forms from meh 'greater' (mehe_ni_dan 'to increase' etc.). In the translation of Ho_m Yasht (Yasna 9-11),

this m'd- is elaborated by glosses which show it was taken as referring to knowledge. Thus mado_ (Yasna 10.14; 10.19) is glossed vidya_ by Neriösengh, and madem mruye (Yasna 9.17) is glossed m'ds.n go_w tis-e_-m pad frahang go_w ku-m da_na_gi_h bawa_d 'speak *ma_yis.n, i.e. say something to me in instruction: that I may have knowledge'...The Middle Persian word for 'intoxicated' is mast, whence masti_h 'intoxication'...Avestan masti-'knowledge' (from the root mand-)...in Yasna 9.20 it is stated that haoma grants, to those who avidly study the sacred text, holiness (spa_nah-) and masti...wisdom. [David Stophlet Flattery and Martin Schwartz, 1989, *Haoma and Harmaline: The botanical identity of the Indo-Iranian sacred hallucinogen 'Soma' and its legacy in religion, language, and middle eastern folklore*, Berkeley, Univ. of California Press, p. 115-116].

It is extraordinary that despite these Pahlavi interpretations of the term mado_, it is supposed to represent 'intoxication'.

mada (Skt. lexicon) m. hilarity, rapture, excitement, inspiration, intoxication RV. &c. &c.; N. of two Sa_mans A_rs.Br.) ; ardent passion for (comp.) MBh. sexual desire or enjoyment, wantonness, lust, ruttishness, rut (esp. of an elephant) MBh. Kalv. &c.; pride, arrogance, presumption, conceit of or about (gen. or comp.) ib.; any exhilarating or intoxicating drink, spirituous liquor, wine, Soma RV. &c. &c.; honey Ragh.; the fluid or juice that exudes from a rutting elephant's temples MBh.; semen virile L.; musk L.; any beautiful object L.; a river L.; N. of the 7th astrol. mansion Var.; Intoxication or Insanity personified (as a monster created by Cyavana) MBh.; N. of a son of Brahma VP.; of a Dalnava Hariv.; of a servant of S'iva; f. any agricultural implement (as a plough &c.) L. <http://www.uni-koeln.de/cgi-bin/SFgate>

matam (Tamil lexicon)

otl matam matam 01 1. opinion, belief; 2. religious tenet, sect, religion; 3. knowledge; 4.

agreement, consent; 5. teaching; 6. esteeming highly any favour received; 7. many; 8. the number '6', as from the six 'matam' otl matam matam 02 1. exhilaration, exultation, joy; 2. strength; 3. pride, arrogance, presumption; 4. animal or vegetable gluten; essence, juice; 5. honey; 6. madness, frenzy; 7. wantonness, lasciviousness; venereal heat; 8. richness of land, fertility; 9. inebriety, intoxication; 10. musk; 11. rock alum; 12. semen; 13. abundance; 14. greatness <http://www.uni-koeln.de>

It is notable that among the 'meanings' adduced to the lexeme, 'matam' in Old Tamil are included: 1. exhilaration, exultation, joy; 8. richness of land, fertility. The early semant. of the lexeme, mada, seems to be related to the exudation from a rutting elephant's temples; this metaphor and the adjective evolved could as well represent the semant. 'pride' or 'esteem'; like the awe evoked by an elephant in rut. As the Soma processing gets completed and is offered to the gods, to Indra in particular, there is a sense of 'exhilaration' at having achieved an 'exudation' which makes the sacrificer 'haughty' having produced something which has value and can lead to 'riches'; riches are the recurrent theme in the R.gveda referred to in the context of soma pavama_na, the processed soma.

Zand i_ Wahman Yasht III, 6-22 reads: (6) Ohrmazd the Sacred (abzo_ni_g = Avestan spenta-) Spirit, creator of the righteous corporeal existence, took the hand of Zoroaster and put liquid omniscient wisdom into it, and said 'drink it'. (7) And Zoroaster drank it and omniscient wisdom was mixed into Zoroaster...(19) I saw a tree with seven branches on it, one gold, one silver, one copper, one brass, one lead, one steel and one mixed iron. (20) Ohrmazd said to Zoroaster Spita_ma: 'This is what I prophesy: (21) The archetypal tree which you saw is the material existence which I, Ohrmazd, created. (22) Those seven branches which you saw are the seven ages which have come. [David Stophlet Flattery and

Martin Schwartz, 1989, *Haoma and Harmaline: The botanical identity of the Indo-Iranian sacred hallucinogen 'Soma' and its legacy in religion, language, and middle eastern folklore*, Berkeley, Univ. of California Press, p. 22]...spenta- occurs in the Avesta (Vi_sperad 9.3) as an epithet of haoma in the phrase haoma su_ra spenta 'the haomas, powerful, sacred', and is the only adjective associating sauma with the name of any Iranian plant. This reference is again, as in Yasht III, 6-22, to the sacredness of the haoma and does not necessarily establish that it was a 'plant'. The Ho_m Yasht (Yasna 10.13) states: Thou (Haoma) makest rich in men, more spenta-, and more insightful whomever apportions thee combined with gav- ('flesh/cattle-product'); it is in Bundahis.n (17.20) that (Haoma) is called the chief of medicinal herbs.

Yasna 9.1: At the mortar time (the first period of the day), Haoma came upon Zarathushtra, purifying the fire and intoning the Gathas. Zarathushtra asked him: (2) 'Who, man, art thou, whom I see as the most beautiful in all the material world, luminous with thine own life?' Then the righteous du_raos.a Haoma answered: 'I am, O Zarathushtra, the righteous du_raos.a Haoma. Take me, Spita_ma, extract me that I may be drunk, praise me with might, as the other saos.yants (saviors) have pressed me'. (3) Thus spake Zarathushtra: 'Praise be to Haoma! Which mortal in the material world first extracted thee? What reward was granted him? What benefit came to him?' [This passage became the basis for Gernot Windfuhr (1986) to argue that haoma was the (geographically remote and psychomorphologically irrelevant) ginseng plant because (the most highly valued) ginseng roots have a homunculus shape (with one eye)]. The beginning of Ho_m Yasht results in the birth of illustrious sons and this benefit was realized by the first four mortals who extracted haoma. Haoma says (Yasna 9.13-15) that the fourth to have extracted him was Pourusha_spa: 'To him were you born, you, righteous Zarathushtra, in the house of Pourusha_spa, opposed to dae_vas, following

the law of the ahuras. (14) Famed in Aryana Vae_jah, you were the first to sing out the Ahuna Vairya prayer; four times, each (time) sung out louder. (15) You who made all the demons disappear beneath the earth, those who had earlier rushed against this earth in the form of men. You who are the strongest, who are the bravest, who are the most active, who are the swiftest, who are the most victorious of the creatures of the Two Spirits.'

Vedic yajn-a-s through the ages

"Indian Brahmins know the plant now used as soma in south Indian rituals, Sarcostemma brevistigma, to be a substitute for an earlier 'soma'. The 'soma' which Sarcostemma has directly replaced, however, seems not to have been the original plant but an Ephedra, a nonintoxicating plant which was itself a secondary constituent of rituals.' [David Stophlet Flattery and Martin Schwartz, 1989, *Haoma and Harmaline: The botanical identity of the Indo-Iranian sacred hallucinogen 'Soma' and its legacy in religion, language, and middle eastern folklore*, Berkeley, Univ. of California Press, p. 4].

Keith, however, notes, while reviewing the chronology of the R.gvedic tradition: '...much which is recorded later is clearly old and is omitted in the R.gveda mainly because that collection is only concerned with a limited portion of the religious practice; on the other hand, religion is in the constant process of change, and things recorded first in the later texts may be new inventions'. (Keith, *Religion and Philosophy of the Veda and Upanishads*, p. 256).

In the Avesta we find Zaotar and Rathwi who are comparable to Hotr. and Adhvaryu of the Vedic tradition.

वृष्णः कोशः पवते मध्व ऊर्मिर् वृषभात्राय वृषभाय
पातवे ।

वृषणाध्वर्यू वृषभासो अद्रयो वृषणं सोमं वृषभाय

सुष्वति ॥

2.016.05 The juice of the gratifying and exhilarating (Soma), the exciter (of) those who drink it, flows to the showerer (of benefits), the dispenser of food, for his beverage; the two priests, the sprinklers of the oblation; and the stones (that express the Soma), offer to the best (of the deities), the Soma, the shedder (of blessings). [Soma juice which is vr.s.an flows (to) vr.s.abha, Indra, who is also vr.s.abha_nau; the two priests, adhvaryu and pratis.t.ha_ta are both vr.s.abhas; so are the stones used to bruise the Soma; Soma juice is vr.s.an.a; so, the thunderbolt is vr.s.a; the car is vr.s.a; the horses, vr.s.n.au; the weapons are vr.s.abha_n.i; Indra and Soma are both designated vr.s.abha; all these forms such vr.s.an, vr.s.an.a, vr.s.abha are from the radical vr.s. = lit. to rain, and implying raining, shedding, showering, sprinkling; or bestowing freely or liberally, when used, as they most commonly are, in a figurative sense].

The term 'adhvaryu_' is interpreted to mean two priests: Hotr. and the Adhvaryu by Potdar (K.R. Potdar, Sacrifice in the R.gveda, Bombay, 1953). Sa_yan.a interprets that the two priests, adhvaryu_, refer to Hotr. and Pratiprastha_tr or Pratis.t.ha_ta. Potdar characterizes four stages in the ritual activity of the Vedic period: 1) worship of the individual divinities within the household; 2) cooperative effort leading to a system of sacrifice; 3) development in the mode of performance; and 4) brahmanical aspect of the sacrifice. Kashikar adds: "If the Iranians may be regarded to have gone to Iran from Punjab on account of differences with regard to the ritualistic religion, the schism might have taken place only at the initial stage. Indra is said to have attained prominence during the second stage, but in view of the very large number of Indra-hymns in the R.gveda, and also in view of the character of Indra, it can hardly be said that Indra attained prominence at a subsequent stage." It is possible that another priest, the

Udga_tr. is implied in the specific references in the R.gveda to the chanting of sa_mans.

Potdar notes: "Very possibly the idea of offering the animal-flesh as an offering came into existence after the introduction of the Pitr.yajn~a." (*Sacrifice in the R.gveda*, p. 118).

अजो भगस् तपसा तं तपस्व तं तै शोचिस् तपतु तं
तै अर्चिः ।

यास् तै शिवास् तन्वो जातवेदस् तभिर् वहैनं सुकृताम्
उलोकम् ॥

10.016.04 The unborn portion; burn that, Agni, with your heat; let your flame, your splendour, consume it; with those glorious members which you have given him, Ja_tavedas, bear him to the world (of the virtuous). [The unborn portion: ajo bha_gah = the goat is your portion; antarpurus.a, which has no body, no organs of sense; heat, flame and splendour: tapas, s'ocis and arcis: the positive, comparative and superlative radiance of Agni].

This r.ca refers to a goat in connection with the fire kindled for Pitr. worship.

मा नो मित्रो वरुणो अर्यमायुर् इन्द्र ऋभुक्षा मरुतः परि
ख्यन् ।

यद् वाजिनो देवजातस्य सप्तेः प्रवक्ष्यामो विदथे

वीर्याणि ॥

1.162.01 Let neither Mitra nor Varun.a, Aryaman, A_yu, Indra, R.bhuks.in, nor the Maruts, censure us; when we proclaim in the sacrifice the virtues of the swift horse sprung from the gods. [a_yu = va_yu (a_yuh satataganta_ va_yuh, vaka_ralopo va_); r.bhuks.in = Indra; but, here Praja_pati, he in whom the r.bhus, or the devas, abide (ks.iyanti); sprung from the gods: devaja-tasya = born as the type of various divinities, who are identified with different parts (e.g. us_a_ va_ as'vasya medhyasya s'irah: Br.hada_ran.yaka Upanis.ad 1.1.1); legend: the horse's origin from the sun,

either direct, or through the agency of the Vasus: sura_d as'vam vasavo niratas.t.a].

This and other r.cas of the su_kta, refer to As'vamedha. Since the Avestan references to animal sacrifice are not as vivid as in the R.gveda, it may be surmised that the Avestan tradition evolved at a stage when the offerings of ghr.ta and soma had replaced animal sacrifice. In the Vedic tradition, the Kr.s.n.a Yajurveda is a combination of the mantra and bra_hman.a portions. The Yajurveda ritual thus, is a development from the ritual of the R.gvedic period. A Bra_hman.a gives the meaning of mantras, the origin and significance of a ritual; a S'rautasu_tra is an orderly description of each Vedic ritual. S'rautasu_tra also prescribe more incidental and expiation rites than those found in the Bra_hman.a. For example, A_pastamba S'rautasu_tra (XV.9.9) note that for the Pravargya rite, if a cow and a she-goat cannot be procured, their milk can be obtained and the mantras prescribed for sa_m.na_yya may be recited. That a Bra_hman.a is closely related to S'rautasu_tra (which use the Vidhi-elements of a Bra_hman.a text) is seen from the fact that every injunction from the bra_hman.a is met with in a S'rautasu_tra. (N.Tsuji, 1952, *On the relation between Bra_hman.as and S'rautasu_tras*, Tokyo). This stage of evolution of the Vedic ritual (exemplified by the Yajurveda, the Bra_hman.a and the S'rautasu_tra) is, perhaps, coterminus, in time, with the evolution of the Avestan haoma ritual tradition.

(C.G. Kashikar, 1964, The Vedic sacrificial rituals through the ages, in: *Indian Antiquary*, Vol. 1, No.2, Bombay, Popular Prakashan)

Next in importance to Agni and Indra, Soma is addressed in about 120 hymns of the Rigveda. Indra and Varun.a gain anthropomorphic status as gods; but Soma is generally represented in its physical nature.

Soma pavama_na. Soma in the process of passing through the refining instrument (potr.). [The actors are: Hotr., connected with Indra; the

Potr. connected with the Maruts (Potr. is the purifying priest; also the 'cleaning' instrument); the Nes.t.r. linked with Tvas.t.r.; the divine wives, agni_dh with agni, the brahman with Indra and the pras'a_s.t.r. with mitra-varun.a]. ulu_khala (mortar) is used to press Soma (RV. I.28,1,5; gra_van is rendered as a 'press-stone'). This is a reference to the pounding of the ore block to pulverize the ore. In Yasna (XXIV.7; XXV.2) ha_vana (hu = to crush) is 'the utensil in which the twigs of the haoma plant are pounded'. Another method refers to the gra_va_n.ah (press-stones) are placed on the 'ox-hide', held by the hands and with ten fingers and activated through two boards. (RV. X.76,94 and 175). Dhis.an.a_ (RV. X.17,12) is perhaps a reference to a hollow in which the press-stones work. This may be a reference to a hollow covered with ox-hide specially prepared on the sacrificial ground. The ox-hide is referred to in RV. IX.79,4; IX.66,29; IX.101,11 and was used to catch the drops of Soma (apparently, the pulverized bits of the electrum ore block). The later rituals state that the pressing-boards are adhis.avan.a phalaka and are also laid across a sounding-hole dug beneath (See Hillebrandt, VM. I.148). A reference to the sacrificial ground with the hollow is mirrored in the term: r.tasya yoni (RV. IX.64,11,22): the home of the yajn~a. The reference to r.tasya dha_ra_ (RV. IX. 63,14,21) is a reference to the process of flowing through the wool strainer.

Indra's outward appearance flowed away from his semen and became suvarn.am hiran.yam when he had drunk Soma that was exposed to witching. (S'Br 13,1,1,4: S'Br. 12,7,1,1: retasa eva_sya ru_pam asravat; tat suvarnam hiran.yam abhavat; cf. J.Gonda, 1991, *The Functions and Significance of Gold in the Veda*, Leiden, E.J.Brill, p. 5). [Note: S'Br. 12,7,2,10: lead (s'i_sa) is 'a form of both bronze and gold'; ahi is a snake; na_ga is a snake; na_ga = lead (Skt.)] RV. 4,17,11 relates how Indra gained cows, gold, troops of horses. When Soma purifies itself, Soma wins cattle, chariots, gold, the light of heaven, and water for them (RV. 9,78,4). The river Sindhu is rich in

excellent horses, good chariots, good garments, rich in gold (RV. 10,7,5,8). RV. 9,112,2 recounts how the blacksmith searches for a customer who possesses (much) gold. Gold is described as s'ukram hiran.yam (RV. 8,65,11) or shining with a light of its own. "He who buys the (Soma) with gold buys it as sas'ukram" (Taittiri_ya Sam.hita_: 6,1,10,1). Even the sun is equated to gold: hiran.yam prati su_ryah (RV. 1,46,10: sun is equivalent to gold). Agni is called hiran.yaru_pa (RV. 4,3,1: gold-like). Apa_m Napa_t (the Child, Descendant of the Waters) has a terrestrial form of the earthly fire and is associated with gold (RV. 2,35,10: hiran.yaru_pah; RV. 2,35,9: hiran.yavarn.a_h). Indra and Va_yu's chariot (which is 'heaven-touching') is made of gold (RV. 4,46,4). RV. 2,35,10 reports that Apa_m napa_t in his earthly manifestation as the sacrificial fire, comes out of the golden yoni (yoni hiran.yaya which is Soma's seat (RV. 9,64,20).

References to electrum may be noticed in RV. 8,45,22 where the metal silver is called 'whitish hiran.ya'; rajata is used as an adjective to mean 'whitish, silver-coloured'. [See A_pS. 5,29,2 which states that rajatam hiran.yam should not be given as a daks.in.a_.]

Pu_s.an has golden ships which sail in the sea (RV. 6,58,3) and bears an axe made of gold (RV. 1,42,6).

RV. 9,86,43 refers to Soma as hiran.yapa_va_h which can be interpreted as 'purified golden Soma.'

Soma was poured through through a sieve made of wool. Every hymn of Book IX of the Rigveda refers to the filtering through the strainer. (pavitra = sieve, means of purifying, filter; pu_ = to purify; pavate = he cleanses himself; pavama_na = self-purifying). References to filtering are in : RV. IX.1, 1 and 6; IX.28, 1,2,6. 'Soma while filtering himself, flows thousand-streamed, across the wool' (RV. IX.13,1). In this filtering process, Soma is tawny in colour; and sounds like the thunder of

the sky or the bellowing cattle. In RV. IX.97,33 the word 'karman' is used to denote the toil involved in the sacrifice.

Soma is mixed with milk (gava_s'ir = addition of milk to Soma), curd and grain. These are intended to stoke the burning embers and to act as oxidizing agents to remove the baser metals.

The rasa of the Soma is emphasized (RV. 8,3,20; 9,67,8; 15; 9,76,1 describes the rasa as kr.tvya or efficacious, as daks.a or ability. Somya rasa (RV. 9,67,8) is the 'sap, which constitutes the essence, best, beneficial element of Soma'. The colour of the rasa is hari (yellow, tawny)(RV. 9,19,3; 9,25,1; 9,103,4; 9,78,2; 10,96,6 and 7. RV. 8,29,1 refers to Soma as babhru (reddish-brown) and a youth who is applying a golden ointment (an~ji... hiran.yayam) to himself. RV. 9,107,4 refers to Soma as utsah hiran.yayah: a spring of gold [Geldner, Rig-Veda ubers, K.F. Geldner, Der Rig-Veda ubersetzt, Cambridge, Mass., 1951, III, p. 110). RV. 9,86,43: sindhor ucchva_se patayantam uks.an.am hiran.yapa_va_h pas'um a_su gr.bhn.ate: "purifiers of gold seize in them (i.e. the vasati_vari_ water left standing overnight) the animal (pas'u_), i.e. the bull (Soma) that flies in the upheaving of the river." Thus in this hymn, the gold which is purified refers to the juice of Soma which is golden.

RV. 6,61,7 refers to Sarasvati_ as hiran.yavartani or one endowed with a golden course. RV. 9,8,39; 38 implore Soma to clarify itself while procuring gold.

RV. 9,75,3: ava dyuta_nah kalas'am acikradan nr.bhir yema_nah kos'a a_ hiran.yaye = Soma rushed down in the jars with loud cries, held (in hands) by the men in the golden vessel (kos'e).

Soma is **pita_deva_na_m** (RV. IX.109,4) or father of the divinities. [The metaphor of 'divinities' has been noted by Niruktam.]

Hiran.yagarbha, the golden germ was evolved in the beginning (RV. 10,121,1'). Hiran.yagarbha is the title of Praja_pati, who is

declared as the only god who encompasses all the created things (ja_tah patir). "(he) who by his might has ever been (babhu_va) the sole lord of the world that breathes and blinks, who rules over these two-footed and four-footed (beings), to what god shall we pay homage with oblation?" (RV. 10,121,3). This reference is considered by some to be a later addition. (for e.g., cf. Edgerton, F., *The Beginnings of Indian Philosophy*, London, 1965). The Being who evolved in the beginning is also the lord of the snow-clad mountains, the ocean and the river Rasa_. He is the fashioner who tied heaven and heaven. When the waters moved producing Agni, from the waters evolved the asu (life-principle?) of the gods. [Note the use of am.s'u as an epithet of Soma.] Hiran.yagarbha is the only god over the gods: yo_ devas.v adhi deva eka asi_t.

Rigveda riddled with allegory and metaphor enters the philosophical domain with these descriptions of Hiran.yagarbha. Post-Rigvedic texts and philosophical tracts abound in references to **Hiran.yagarbha** (lit. womb of gold) as attested by J. Gonda (opcit., ppo. 217-246). Ma_nava S'rautasu_tra (MS. 6,2,3,9) stipulates the use of stanzas 1,3, 2-7 of RV. 10,121 (Hiran.yagarbha su_kta) in connection with the naturally perforated 'brick' (agnicayana). It has been argued elsewhere that the perforated bricks are integral to the later-day alchemical processes of transmuting baser metals into gold. (Kalyanaraman, opcit., in press).

Decoding of Soma

It has been argued that it was the eclipse of the Indus Valley civilization in the second millennium BC that brought to an end the flourishing Indus-Mesopotamian trade up the Gulf; but this has yet to be satisfactorily confirmed. Stray indicators suggest continuing, if intermittent activity. In the middle of the fourth century BC a Babylonian official was stationed on Dilmun, whence he reported back on local threats to the date crop. Then Tukulti-Ninurta I of Assyria (c. 1243-1207 BC), after his sack of Babylon, assumed the title 'King of Dilmun and Meluhha', emphasizing contemporary Babylonian interest in these regions, even if the full implications of the ancient names no longer applied (Brinkman 1972: 275-6; 1976: 314)...(Moorey, 1994, p. 217ff.)

Kingdom of Lydia, under Persian rule, ca. 546-



510 BC. Silver Siglos. S-3424. Obverse : Fore parts of a bull and lion facing each other. Reverse : Incuse double punch. 13.5 x 15 mm. 5.3 grams. ... This type was introduced by Kroisos sometime after 560 BC, and was probably struck continuously through the reigns of Cyrus, Cambyses and in the early part of the reign of Darius I, ca. 510 BC. The style of these varies in quality, and it is generally accepted that the finer the style, the earlier the issue. We have never seen any proof of this theory, but for the time being accept it. This specimen probably dates to the middle part of this period. The infamous Lydian King Croesus (561-546 B.C.), created the first official coins in the true sense of the word. This king's coins were issued by a state authority and guaranteed by the monarch. They had the



official design (a lion's head) of the empire, and the coinage metal content was pure. He even went so far as to prohibit the use of electrum, allowing only pure silver and gold coins to circulate freely. He is also credited with establishing the first bimetallic standard, in this case with the ratio of silver-to-gold set at 13 to 1. <http://www.coin-gallery.com/cgearlycoins.htm> It was King Croesus of Lydia who, around 560 BC, ordered the first gold coins to be struck

"According to the Babylonian system of weights, 1 talent (30 kg) = 60 minas, one mina (504 grams) = 60 shekels, and one shekel (8.4 grams) = 20 gerahs. True monetary systems did not exist until the development of coinage c.700BC, however, and prices before 700BC refer to specific weights of metal. Nb. One troy ounce = 31.1 grams. Prices in silver are as follows:



Mesopotamia Circa 2000BC

One sheep cost 2.6 to 16 grams.
A female slave cost 52 to 192 grams.
Urban property (one square meter) cost 1.3 to 22 grams.

Source: Financing Civilization
<http://viking.som.yale.edu/will/finciv/cap14.html>

From
<http://www.fordham.edu/halsall/ancient/mesopotamia-contracts.html> Ancient History Sourcebook. This site provides samples of ancient contracts, with examples below:

2300BC. One slave was purchased for 10 shekels.
2000BC. A house fronting a street with adjoining land was purchased for 4 ½ shekels.
2000BC. A house was leased for one year for 1

shekel.

Mesopotamia after 1780BC

The Code of Hammurabi c.1780BC dictated a number of fines, fees, prices and wages, complete text and commentary at

<http://fordham.edu/halsall/ancient/hamcode.html>

The builder of a house received 2 shekels per sar (36 square meters), with doors and other woodwork apparently not included (law 228). The builder of a boat of 60 gur (18,000 liters) received 2 shekels (law 234). Daily wages for various crafts and seasons ranged from 4 to 6 gerahs (laws 273-274), roughly 1/4 shekel. Therefore, Babylonian workers earned about 2.1 grams or 1/15 ounce silver per day. Note also that houses must have been simple structures that could be completed with 8 days of labor or less. Bounty for capture of a runaway slave was 2 shekels (law 17) about 10% of the slave's cost. A veterinarian performing a serious operation on an ass or ox received a fee of 1/6 shekel (law 224)."

http://www.gold-eagle.com/editorials_00/mbutler031900.html

A reference to itinerant metal-smiths who make arrows of metal, in the Rigveda (9.112.2) will have to be re-evaluated in the context of the evidence for sources of tin India and Afghanistan.

jarati_bhiih os.adhi_bhiih parn.ebhiih
s'akuna_na_m
ka_rma_ro as'mabhiih dyubhiih
hiran.yavantam icchati_ (RV. 9.112.2)

This is a description of a smithy, perhaps an allusion to the making of copper reducing the ores. The metalsmiths sold the products (a copper implement or copper-tipped arrow or golden ornament) to moneyed-people.

Words related to minerals, smithy, weapons and metals in the Rigveda:

atas = combustible material, firewood (RV. 1.58.2, 4; 2.4.7; 3.7.3; 4.4.4; 4.7.10; 10.89.5)
ayas = metal (copper-bronze)(RV. 1.57.3; 1.163.9; 4.2.17; 6.3.5; 6.47.10; 6.75.12; 10.53.9-10)
ayasmaya = pitcher (RV. 5.30.15)
ayodam.s.t.ra = fire that bites metal (RV. 1.88.5; 10.87.2)
a_yasi_ = metallic (RV. 1.116.15; 1.118.8; 7.3.7; 7.15.14; 7.95.1; jan:gha_ a_yasi_m = artificial metallic leg for vis'pala_ (RV. 1.116.15; 1.118.8); also used to qualify city, fort.
pura a_yasi_ = city, building, fort, body-metallic (RV. 1.58.8; 2.20.8; 4.27.1)
a_ha_va = metallic pitcher; later, Pa_n.ini defines as cattle-feeding water vessel (RV. 1.34.8)
is.u = arrow (RV. 1.13.4; 1.64.10; 2.24.8; 5.57.2; 8.7.4); a_la_kta_ ayomukham is.u = poison and metal-tipped arrow (RV. 6.75.15); cf. Pa_n.ini 6.2.107
r.s.t.i = javelin (RV. 1.37.1; 1.64.4; 1.166.4; 1.169.3; 5.52.6; 5.54.11; 5.57.2; 8.20.11)
karma_ra = metalsmith (RV. 10.72.2
brahman.aspatieta_ sam karma_ra iva_dhamat, deva_na_m pu_rvy_e yuge asatah sadaja_yata = metalsmith who blows in a furnace and makes metal objects presumably by casting of molten metal).
ka_rma_ra = metalsmith who makes arrows etc. of metal (RV. 9.112.2: jarati_bhiih os.adhi_bhiih parn.ebhiih s'akuna_na_m, ka_rma_ro as'mabhiih dyubhiih hiran.yavantam icchati_)
kulis'a = axe, kut.ha_ra (RV. 1.32.5)
kr.ti = sword (RV. 1.168.3: has.tes.u kha_dis'ca kr.tis'ca = a guard and a sword; that which cuts. Sword (or scissor?). In Pa_n.ini, kr.ta (7.2.57) means 'to cut into pieces'.
ks.ura = razor (RV. 1.166.10; 8.4.16; 10.28.9); yada_ te va_to anuva_ti s'ocirvapteva s'mas'ru vapasi prabhu_ma = with wind at its back, fire wipes out the trees and forests and 'shaves' the land just as the barber shaves (with a razor)(RV. 10.142.4)

khanitra = spade or digging tool (RV. 1.179.6: khamana_nah khanitrah = by the digging spade).
khanitrima = that which is obtained by digging (RV. 7.49.2: sravanti khanitrima_ = flowing canal obtained by digging).
kha_di = arm-shield (RV. 1.166.9); hastes.u kha_di (RV. 1.168.3); kha_di hastam (wristlet or bangle or armlet: 5.58.2); patsu kha_dayo (anklet: 5.54.11; am.ses.u (skandhe) kha_dayo (shoulder decoration: 7.56.13)
ghan = hard (weapon(RV. 1.8.3; 1.33.4)
tamba = pitcher, metallic pitcher ayastamba (RV. 5.30.15); cf. TA-BI-RA in substrate Sumerian meaning 'merchant'.
da_tra = sickle (for cutting crops such as barley)(RV. 8.78.10); Pa_n.ini calls this serrated sickle or crooked knife (3.2.182, 8.4.52)
dra_vayati - melts or to melt (RV. .3.4); dravi = smelter or metalsmith who melts metal (RV. 6.3.4: tignam...paras'uh na jihva_m dravirna dra_vayati da_ru dhaks.at: fire devours wood with its axe-like sharp tongue, just as the smelter melts the metal).
dravin.a = the wealth or gem that is obtained by melting, e.g. gold and silver (RV. 4.5.11; 4.23.4; 4.33.10; 9.109.9; 10.70.7)
dhama = to blow (in a furnace)(RV. 10.72.2)
dha_ra_ = sharpened edge of a metallic weapon; ayaso na dha_ra_m (RV. 6.3.5; 6.47.10)
dhma_tari_ = the blower or the metalsmith; dhma_teva dhamati s'is'ite dhma_tari_ yatha" = as the blower blows to produce sharp flame (RV. 5.9.5)
nis.ka = gold ornamental pieces to decorate the neck (RV. 2.33.10); may also mean gold coins (RV. 1.126.2; 4.37.4; 5.27.2), alludes to goldsmith (RV. 8.47.15)
nis.kagri_va = golden necklace (RV. 5.19.3)
pavi = spear sharpened (RV. 10.180.2: pavim tignam)
pavitra = purifier or strainer (of soma)(RV. 1.28.9; 3.36.7; 8.33.1; 8.101.9)
paras'u = axe (RV. 1.127.3; 6.3.4; 7.104.21; 10.28.8)(s'is'ite paras'um sva_yasam = sharpened metallic axe (RV. 10.53.9); pra_ca_

gavyantah pr.thupars'avo yayuh da_sa_ ca vr.tra_ hatama_rya_ni ca = with big axes came to the east the cow-plunderers -- the Da_sas as well as some A_ryas (RV. 7.83.1) In Pa_n.ini it means a curved knife or axe or sickle (5.3.117)
pa_s.ya = stone (RV. 1.56.6)
pha_la = plough (RV. 4.57.8; 10.117.7)
ba_n.a = arrow (RV. 6.75.17)
bhurija = carpenter's tool to make chariot (RV. 4.2.14; 8.4.16; 9.71.5)
rajata = silver (RV. 8.25.22)
rayim = wealth (RV. 1.73.1; 1.159.5; 2.21.6; 3.1.19; 4.2.7; 4.34.10; 4.36.9; 5.33.6; 6.6.7; 6.31.1); ra_ya = treasure or wealth (RV. 8.4.15-16) Is rayim derived from rajata = silver?
rasa = liquid essence, extract, juice (RV. 1.23.23; 1.187.4-5; 5.43.4; 6.44.21)
ra_dhas = wealth (RV. 1.9.5; 1.17.7; 2.13.13; 2.22.3; 4.32.21; 5.13.6; 5.38.1). In 5.52.17 ra_dha_ is connected with yamuna_, the wealth of cattle and horses in the valley of the yamuna_: yamuna_ya_madhi s'rutamudra_dho gavyam mr.je ni ra_dho as'vam mr.je
rukma_ = chest ornament (made of gold)(RV. 1.166.10; 2.34.2 and 8; 5.53.4; 5.54.1; 5.55.1; 5.57.5; 8.46.33; 9.15.5: vaks.ahsu rukma_)
la_n:gala - plough (RV. 4.57.5 s'unam kr.n.atu la_n:galam = let the plough cultivate well)
vajra = thunder. spear. harpoon to be thrown or barbed harpoon for fighting (RV. 1.33.2; 1.51.7; 6.23.4)
vadhara = weapon (RV. 1.32.9; 4.22.9; 8.24.27)
varman = protective shield, breast armour (RV. 1.31.15; 1.140.10; 6.75.1; 8.47.8; 10.107.7)
va_s'i_ = metallic tool-chisel, axe or adze (RV. 1.37.2; 1.88.3; 8.29.3); in the neolithic age, this was made of stone: as'manmayi_ va_s'i_ (RV. 10.101.10)
vis'pala_ (RV. 1.116.15: jan:gha_m a_yasi_m vis'pala_yai = the lady with metallic leg)(RV. 1.112.10; 1.117.11; 1.118.8; 10.39.8)
vr.ka = plough (RV. 1.117.21)(RV. 8.22.6=yavam vr.ken.a kars.a_thah)
ves'i_ = needle (RV. 7.18.17)
s'ara = arrow (RV. 1.148.4; 10.125.6; 10.178.3); sharpened arrow = s'arva_ s'is'a_nah (RV. 10.87.6); s'arya, s'arya_ = arrow (RV. 1.119.10)

s'aru = arrow (RV. 1.100.18; 1.172.2; 1.186.9; 4.28.3; 10.87.6; 10.125.6); in 2.12.10 it may mean a spear.

s'una_si_ra_ = plough (si_ra_) and its tip (phala_)(RV. 4.57.5 and 8); si_ra_ = plough (RV. 10.101.3-4); same meaning in Pa_n.ini (6.2.187)

s'u_la = metal spike (RV. 1.162.11)

su_ci = needle for sewing (RV. 2.32.4: ra_ka_maham suhava_m..si_vyatvapah su_cya_cchidyama_naya_dada_tu = let the Goddess Ra_ka_ sew with needle our destination (a baby).

sr.ka = spear or harpoon to be thrown (RV. 1.32.12; 10.180.2); sr.kam sams'a_ya = shapened spear (RV. 10.180.2)

sr.n.i_ = sickle (RV. 10.101.3 = it sr.vyah pakkameya_t = let sickles fall on the ripe harvest)

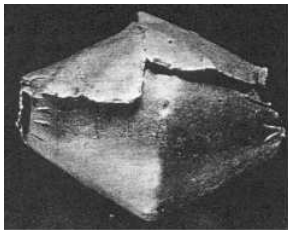
su_na = knife (RV. 1.162.13)

swadha_ = ornament (RV. 4.10.6)

swadhiti = axe to cut wood and forests (RV 2.39.7; 3.2.10; 3.8.6 and 11; 5.7.8; 7.3.9; 8.102.19; 10.89.7; RV. 3.8.11); may also mean sword (RV. 2.39.7: ks.n.otren.eva svadhitim sam s'is'i_tam = shapen the swords/axes on the whetstone)

sa_yaka = arrow (RV. 2.33.10; 10.48.4)

hiran.ya = gold (RV. 1.22.5; 1.33.8; 1.43.5; 1.122.2; 1.162.16; 2.33.9; 3.34.9; 4.17.11; 9.112.2) hiran.yasyeva kalas'am = golden pitcher (RV. 1.117.12); hiran.ya karn.a = one with golden ear ornament or ring (RV. 122.14); ghr.tam na pu_tam tanuh...s'uci hiran.yam, tatte



rukmo na rocata svadha_vah = fire, your appearance is like purified clarified butter and pure golden ornaments (RV. 4.10.6).

hiran.yavartani = golden way or river whose bank-sands contain alluvial gold particles (RV. 6.61.7; 8.26.18; 10.75.8)

heti = weapon (RV. 1.103.3; 1.121.10; 3.30.17; 6.62.9)

Gold bead; Early Dynastic necklace from the Royal Cemetery; now in the Leeds collection.

Gold in the civilization

Gold objects recorded from Mohenjo-daro, Harappa, Chanhudaro, Lothal and Kunal are: bangles/bracelets, pendants, amulets and necklaces, armlets, ear-pendants, ear-rings, ear studs, beads, brooch, fillets, finger-rings, terminals, caps, netting needles, cone, gold foil/gold leaves, pin, waste pieces of gold.

The terms connoting gold in Rigveda are: hiran.ya, suvarn.a, ja_taru_pa, candra,harita. Gold objects mentioned in the Rigveda are: rukma (golden chain or disk), nis.ka (neck-ornament of gold beads or coins), sraj (gold string interspersed with jewels).

Soma, the heavenly nectar of life in golden jars (kalas'a) is the fountain of gold: "Soma flows on for us as winner of the kine, winner of thousands, earth, water, and light, and gold; He whom the Gods have made a gladdening draught to drink, the drop most sweet to taste, weal-bringing, red of hue." (RV. IX. 78.4; Griffith, RV, Vol. II, p. 335).

Nis.ka-gri_va connotes a gold ornament worn on the neck, won through soma:

"Svaitreya's people, all his men, have gloriously increased in might. A gold chain Br.haduktha wears, as through his Soma, seeking spoil." (RV. V.19.3; Griffith, RV, Vol. I, p.482). Perhaps, nis.ka was also a currency (RV. I.126.2). Gold is used in the purchase of Soma: S'rautasu_tras: Baudha_yana (6.12-13; 14-15); Bha_radva_ja (10.16.2-18.14); A_pastamba (10.24.1-27.8); Ka_tya_yana (7.7.3-8.25): "After having handed over king Soma to the Soma-seller, the Adhvaryu should ask him: "O, Soma-seller, is your soma available for purchase? He should reply: "It is available for purchase." The Adhvaryu should (offer to) purchas it for ten (objects), (namely) seven cows and the three (objects, that is to say), gold,

a piece of cloth, and a she-goat..." (Satya_s._ad.ha, .2)(R.N.Dandekar, S'rautakos'a, vol.II, pt. I, p. 129).

The place of sacrifice is also golden (RV. V.67.2; IX.64.20). Even weapons are of gold. "The kanvas sing forth agni's praise together with our maruts' who wield thunder and wear swords of gold." (RV. VIII.7.32).

Gold is won from the earth, washed and cleaned and purified (RV. I.117.5).(cf. M.N.Banerjee, "On Metals and Metallurgy in Ancient India", Indian Historical Quarterly, Vol. III, March 1927, no. 1, p. 123).

[Ball writes: "Gold is mined for, in quartz veins 3 miles to the north of Kandahar city... The gold is sometimes chiselled out in pure granules and sometimes in large nuggets..." (V. Ball, *Manual of the Geology of India*, III, pp. 208-9). Ball also refers to an old record of the discovery of a gold mine in Afghan Seistan and also notes Bannu, Peshawar, Hazara, Rawalpindi, Jhelam, Ambala and certain Punjab Himalayan princely states such as Kangra as gold-panning centres.]

Gold is won from the rivers; Sindhu was full of golden beds and hence is called 'golden' and 'of golden stream' (RV. X.75.8; VI.61.7; VIII.26.18). "Rich in good steeds is Sindhu, rich in cars and robes, rich in gold, nobly-fashioned, rich in ample wealth". (RV. X.75.8). "This river with his lucid flow attracts you more than all the streams. Even Sindhu with his path of gold." (RV. VIII.26.18).

The path is golden (hiran.yavartani) (RV.I.92.18; V.75.2;3; VIII.5.11;8.1).

Praja_pati is the progenitor of the universe and is hiran.yagarbha (the golden foetus): "in the beginning rose hiran.yagarbha, born only Lord of all created beings. He fixed and holdeth up this earth and heaven what God shall we adore with our oblation." (RV. X.121.1; Griffith, RV, Vol. II, p. 566).

Gold (hiran.yam) was the objective of the Vedic singers (RV. VI.47.23; VII.78.9). The prayers refer to gold that glitters (RV. X.107.7), that gives wealth (RV. II.34.11; VII.66.8), that is self-luminous (RV. V.87.5). The singers seek: "The Sea and all the Deities shall give us him with the golden ear and neck bejewelled. Dawns, hasting to the praises of the pious, be pleased with us, both offerers and singers." (RV. I.122.14; Griffith, RV, Vol. I, p. 169)

Gods Indra, Mitra, Varun.a etc. were often described as golden in hue (RV. I.46.10; I. 167.3; I.139.2; II.35.10; IV.3.1; IV.10.6; VI.16.38; VII.45.2; X.20.9) driving from golden seats (RV. IV.46.4; VIII.5.28; VIII.22.9) in golden chariots (RV. I.30.16; I.35.2; 56.1; 139.4; IV.1.8; IV.44.4; IV.44.5; VI.29.2; VIII.1.24; VI.66.1; VIII.33.4; VIII.46.24), having shafts or poles (RV. I.35.4; 5; VIII.5.29), wheels and axles all bright as gold (RV. I.64.11; 105.1; 139.3; 180.1; VI.56.3; VIII.5.29) with golden reins for the horses (RV. VIII.22.5) who had golden manes (RV. I.122.14) and were bedecked with golden ornaments.

Gods As'vins and Maruts and the asuras alike adorned themselves with magnificent jewellery using gold rings (RV. VIII.32.29) gold earrings (RV. VII.56.13; I.166.10; I.64.11; V.54.11; II.34.3; VI. 16.38) golden necklets and armlets (RV. VII.56.13; I.166.10; I.64.11; V.54.11; II.34.3; VI.16.38).

"Your rings, O maruts, rest upon your shoulders, and chains of gold twined upon your bosoms. Gleaming with drops of rain, like lightning-flashes, after your wont ye whirl about your weapons." (RV> VII.56.13; Griffith, RV, Vol. II, p.55)

References to pur (urban settlement), ayas (metal), and samudra (sea) in the Rigveda indicate that the culture was not exclusively pastoral but had sea-faring, trading activities and used metals to build-up urban settlements:

ra_yah samudra_ns'chaturō asṁabhyam
soma vis'vataḥ a_pavasva sahasrin.ah (RV.
IX. 33.6)

'from every side, O Soma, for our profit, pour
thou forth four seas filled full of riches
thousandfold'.

Ayas, copper, metal

स इद् अस्तेव प्रति धाद् असिष्यञ् छिशीत् तेजो
इयसो न धाराम् ।

चित्रध्वजतिर अरतिर यो ओर् वेर् न द्रुषद्वा

रघुपत्मजलतहाः ॥

6.003.05 He casts (afar his flames) as an archer
(his arrows), and sharpens when about to dart
his radiance, as (a warrior whets) the edge of
his metal (weapons), he who, variously moving,
passes through the night, like the light-falling
foot of a bird perched upon a tree. [The edge of
his metal: ayaso na dha_ra_m].

इन्द्र मृळ मह्यं जीवातुम् इच्छ चोदय धियम् अयसो न
धाराम् ।

यत् किं चाहं त्वायुर् इदं वदामि तज् जुषस्व कृधि मा
देववन्तम् ॥

6.047.10 Make me happy, Indra; be pleased to
prolong my life; shapen my intellect like the
edge of a metal sword; whatsoever, desirous (of
propitiating) you, I may utter, be pleased by it;
render me the object of divine protection.

Other r.cas where the word ayas occurs are as
follows:

ayas = metal (copper-bronze)(RV. 1.57.3;
1.163.9; 4.2.17; 10.53.9-10)

ayasmaya = pitcher (RV. 5.30.15)

ayodam.s.t.ra = fire that bites metal (RV.
1.88.5; 10.87.2)

a_yasi_ = metallic (RV. 1.116.15; 1.118.8;
7.3.7; 7.15.14; 7.95.1; jan:gha_ a_yasi_m =
artificial metallic leg for vis'pala_ (RV.
1.116.15; 1.118.8); also used to qualify city,
fort.

pura a_yasi_ = city, building, fort, body-
metallic (RV. 1.58.8; 2.20.8; 4.27.1)

अस्मै भीमाय नमसा सम् अध्वर उषो न शुभ्र आ भ
रा पनीयसे ।

यस्य धाम श्रवसे नामेन्द्रियं ज्योतिर अकारि हरितो
नायसे ॥

1.057.03 Beautiful Us.as, now present the
oblation in this rite to the formidable, praise-
deserving Indra, whose all-sustaining,
celebrated, and characteristic radiance has
impelled him hither and thither, (in quest) of
(sacrificial) food, as (a charioteer drives) his
horses (in various directions).

अच्छिद्रा सूनो सहसो नो अद्य स्तोतृभ्यो मित्रमहः

शर्म यच्छ ।

अग्रे गुणन्तुम् अलतहस उरुष्योर्जो नपात् पूर्भिर्

आयसीभिः ॥

1.058.08 Son of strength, favourably-shining
Agni, grant to your worshipper on this occasion
uninterrupted felicity; offspring of food,
preserve him who praises you from sin with
guards of metal.

एतत् त्यन् न योजनम् अचेति सस्वर् ह यन् मरुतो
गोतमो वः ।

पश्यन् हिरण्यचक्रान् अयोदंष्ट्रान् विधावतो वराहान् ॥

1.088.05 This hymn is known to be the same as
that which Gotama recited Maruts, in your
(praise) when he beheld you seated in your
chariots with golden wheels, armed with
weapons, hurrying hither and thither, and
destroying your mightiest foes.

चरित्रं हि वेर् इवाच्छेदि पुर्णम् आज्ञा खेलस्य

परितक्म्यायाम् ।

सद्यो जङ्घाम् आयसी विश्पलयै धनै हिते सतवे

प्रत्य् अधत्तम् ॥

1.116.15 The foot of (Vispala_, the wife of)
Khela, was cut off, like the wing of a bird, in an
engagement by night; immediately you gave
her a metallic leg, that she might walk, the
hidden treasure (of the enemy being the object

of the conflict). [Khela was a king; Agastya was his purohita. Through his prayers the As'vins gave Vis'ala_ a metallic leg].

युवं धेनुं शयवै नाधितायापिन्वतम् अश्विना पूर्व्याय ।
अमुञ्चतं वर्तिकां अलतहसो निः प्रति जङ्घा
विश्रपलाया अधत्तम् ॥

1.118.08 You filled his cow with milk, As'vins, for the ancient S'ayu, when imploring (yoru aid); you liberated the quail from danger; you gave a leg to Vis'pala_.

हिरण्यशृङ्गो ऽयो अस्य पादा मनोजवा अवर् इन्द्र
आसीत् ।

देवा इद् अस्य हविरद्यम् आयन् यो अर्वन्तम् प्रथमो
अध्यतिष्ठत् ॥

1.163.09 His mane is of gold; his feet are of bronze; and fleet as thought, Indra is his inferior (in speed). The gods have come to partake of his (being offered as) oblation; the first who mounted the horse was Indra. [His mane is of gold: hirn.yas'r.n:ga = lit. golden-horned; but figuratively, golden-maned].

तस्मै तवस्यम् अनु दायि सन्नेन्द्राय देवेभिर्
अर्णसातौ ।

प्रति यद् अस्य वज्रम् बाह्वोर् ध्रुव हन्वी दस्यून् पुर
आयसीर् नि तारीत् ॥

2.020.08 Vigour has been perpetually imparted to Indra by his worshippers (with oblations), for the sake of obtaining rain; for which purpose they have placed the thunderbolt in his hands, wherewith, having slain the Dasyus, he has destroyed their metal cities.

सुकर्माणः सुरुचो देवयन्तो ऽयो न देवा जनिमा
धमन्तः ।

शुचन्तो अग्निं ववृधन्त इन्द्रम् ऊर्व गव्यम् परिषदन्तो
अगमन् ॥

4.002.16 Performers of good works, brilliant and devout, the praises of the gods have freed their birth from impurity, as (a smith heats)

bronze; exciting Agni, elevating Indra, and wandering about (in search), they have gone to the vast (hidden) herd of cattle.

गर्भे नु सन्न अन्व एषाम् अवेदम् अहं देवानां
जनिमानि विश्वा ।

शतम् मा पुर आयसीर् अरक्षन्न अघं श्येनो जवसा
निर् अदीयम् ॥

4.027.01 Being still in the germ, I have known all the births of these divinities in their order; a hundred bodies of metal confined me, but as a hawk I came forth with speed. [i.e., until the sage comprehended the differences between the body and soul, and learned that soul was unconfined, he was subject to repeated births; but in this stage he acquired divine knowledge, and burst through the bonds with the force and celerity of a hawk from its nest; va_madeva s'yena ru_pam a_stha_ya garbha_d yogena nihsr.tah = Va_madeva, having assumed the form of a hawk, came forth from the womb by the power of Yoga (Ni_timan~jari)].

चतुःसहस्रं गव्यस्य पश्वः प्रत्य् अग्रभीष्म रुशमेष्व्
अग्ने ।

घर्मश् चित् तप्तः प्रवृजे य आसीद् अयस्मयस् तं व्
आदाम् विप्राः ॥

5.030.15 We have accepted, Agni, the four thousand cattle from the Rus'ama_s; and the glowing, the golden ewer prepared for the solemnity, we who are wise have accepted it. [The golden ewer: gharma's cit taptah prav.r.je ya a_sid ayasmayah: ayasmayah = made of metal, here, made of gold, hiran.yamaya kalas'a, a ewer; gharma'scit = maha_vi_ra iva, that is, like the ewer or vessel so termed, containing a mixture of Soma, melted butter, and milk, perhaps put upon the fire: yad ghara ityatapat tad gharma'sya gharma'tvam it s'ruti].

यथा वः स्वाहाग्नये दाशेम परीळाभिर् घृतवद्भिश् च
हव्यैः ।

तेभिर् नो अग्ने अमितैर् महौभिः शतम् पूर्भिर्

आयसीभिर् नि पाहि ॥

7.003.07 When we present to you, Agni, the sacred offerings with oblations mixed with butter and milk, then protect us with those vast unbounded, innumerable golden cities and metals.

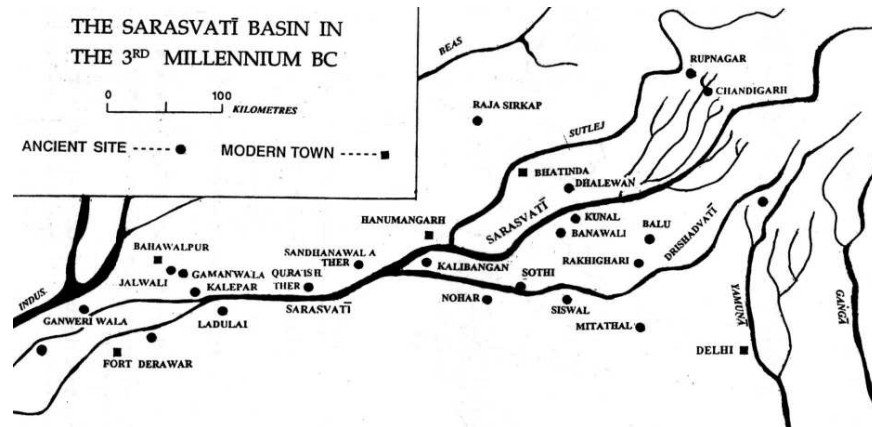
अधा म॒ही न आय॒स्य् अनाधृष्टो नृपी॑तये ।

पूर भवा शतभुजिः ॥

7.015.14 Do you, who are irresistibel, be to us,
for the protection of our posterity, like the vast
spacious, metal-walled cities (of the
ra_ks.asas).

प्र क्षोद॑सा॒ धाय॑सा स॒स्र ए॒षा सर॑स्वती ध॒रुण॑म् आय॑सी

पूः ।



त्वष्टा माया वेद् अपसाम् अपस्तमो बिभ्रत् पात्रा

देवपानानि शूलततमा ।

शिशी॑ते नू॒नम् प॑र॒शुं स्वा॑य॒सं ये॑न वृ॒श्वाद् ए॑त॒शो

ब्रह्मणस् पतिः ॥

स॒तो नू॒नं क॑वयः॒ सं शि॑शीत॒ वाशी॑भिर् याभिर् अ॒मृता॑य

तक्षथ ।

वि॒द्वल॑तसः प॒दा गु॒ह्यानि॑ कर्त॒न॒ येन॑ दे॒वासो॑ अमृ॒त॒त्वम्

आ॒न॒शुः ॥

10.053.09 Tvas.ta_ knows the arts of
fabricating (drinking vessels), the most skilful

प्र॒बा॒ध॒ना र॒थ्ये॒व या॒ति॒ वि॒श्व॒ा अ॒पो म॒हि॒ना सि॒न्धु॒र

अन्याः ॥

7.095.01 This Sarasvati_, firm as a city made of metal, flows rapidly with all sustaining water, sweeping away in its might all other waters, as a charioteer (clears the road). [Firm as a city dharun.am a_yasi pu_h = ayasa nirmita puri_va; dharun.am = dharun.a, dha_rayitri_, supporter].

The reference to a_yasi_pu_h, cities of metal is significant, in the context of the archaeological finds from over two thousand bronze-age sites, along the rivers Sarasvati_ and Sindhu.

of artificers bearing the sacred drinking cups
out of which the gods drink-- verily he sharpens
his axe of good metal, wherewith the white-
complexioned brahman.aspati cuts them.

10.053.10 Verily being sages, (R.bhus) sharpen the instruments with which you fabricate the cups for the nectar. Do you, who are wise, prepare the mysterious paths whereby the gods have attained to immortality.

अयौदंष्ट्रो अ॒र्चिषा॑ यातु॒धानान्॑ उप॑ स्पृश॒ जातवेदः॑

समिद्धः ।

आ जिह्वया मूर्देवान् रभस्व क्रव्यादौ वृत्तव्यू अपि

धत्स्वासन् ॥

10.087.02 Ja_tavedas, who have teeth of iron, consume the Ya_tudha_nas' flame when kindled, destroy the destructive (spirits) with your tongue, cut up the eaters of flesh, and put them in your mouth. [Ya_tudha_nas: i.e., ra_ks.asas].

व्रजं कृणुध्वं स हि वो नृपाणो वर्म सीव्यध्वम् बहुला

पृथूनि ।

पुरः कृणुध्वम् आयसीर् अधृष्टा मा वः सुखोच् चमसो

दृलतहता तम् ॥

10.101.08 Construct the cow-stall, for that is the drinking place of your leaders (the gods), fabricate armour, manifold and ample; make cities of metal and impregnable; let not the ladle leak, make it strong. [Alternative trs.: 'stitch ye the coats of armor, wide and many; make metallic forts, secure from all assailants'.]

The semantic evolution is to relate ayas to metals such as iron:

ayam, ayaci_cam, ayappar-r-i, ayo_r-kam = iron, iron-filings (Ta.lex.)

ayomala = rust of iron (Skt.lex.)

The Vedic texts -- in particular, the references to Soma processing-- also establish that the peoples of India lived in harmony on the banks of the Rivers Sarasvati and Sindhu: one group of metallurgists processed Soma, electrum -- gold-silver quartz or alloy; another ayas, copper and related alloys using tin, arsenic, lead and zinc to produce hardened weapons and tools which indeed exemplified the Bronze Age not only of India but of the extended contact area composed of Oxus, Mesopotamian, Egyptian and Crete-Minoan civilizations.

“Gold and Electrum. Gold ornaments or flakes of gold leaf have been recovered from most excavated Harappan Phase sites. All of the relatively complete pieces of gold ornaments have been recovered from hoards where objects have been stored in copper or ceramic vessels and buried within a house. Fragments of gold leaf or tiny beads are not uncommon in the

excavations of Harappan Phase sites; the gold leaf may be derived from beads or other objects that were covered with decorative gold, and tiny beads undoubtedly derive from broken necklaces. Only a few small gold beads have been recovered from Harappan Phase burials (Dales and Kenoyer, 1990). Very little of the gold recovered from Indus Valley Tradition sites has been subjected to chemical analysis. The earlier excavators used visual criteria to discriminate between pure gold and a gold/silver ally. The gold/silver alloy was thought to be either a natural electrum or an artificial alloy made by the Indus gold/silversmiths. (5 objects analyzed)...The proportion of gold to silver was between 91% and 94% in the five gold objects...The gold/silver object from Harappa was a lump of partly melted and hammered metal visibly composed of gold and silver...The object was obviously in the process of manufacture, and may reflect a stage in the production of artificial gold/silver alloy. Two ‘gold’ objects from Lothal have been analyzed by Lal (1985: 664-665) and contain 33.45% and 41.48% silver, but no copper, nickel, lead, or zinc...items were made from electrum...which has a relatively limited distribution in South Asia...The most obvious source of alluvial gold is the uppper reaches of the Indus Valley itself and the streams of northern Afghanistan (Pascoe 1931; Stech and Piggott 1986). Significant quantities of gold are found in the tributaries of the Amu Darya, and the Kokcha river itself cuts through deposits that have gold ores. The most convincing indications to date of gold working at a Harappan Phase site have been found at Shortugai in Afghanistan, where the excavators found a fine globule (gouttelette) of gold imbedded in the cuprous vitrified internal surface of a crucible fragment (Frannfort 1989: 136).” (Kenoyer and Miller, 1999, pp. 119-120).

Thus, decipherment of inscriptions occurs within the framework of the decipherment of the principal discoveries in and development of the civilization, finding new ways to relate to environmental phenomena and new social

contracts, using the products of minerals and metals of the Bronze Age.

The following reviews of Va_japeya, As'vamedha and Ra_jasu_ya are presented to view in perspective, the definition of a 'ratha' in Vedic times. The overall picture that emerges is that the 'ratha' was a battle car or a vehicle of royalty used to extend dominion. As a metaphor, it was used to elaborate on the passage of 'time', and to symbolise 'victory' or the achievement of Soma.

The dominant metaphor connoted by 'ratha' is NOT 'speed', but force, va_ja.

Va_japeya and As'vamedha

"Just as in the MBh (*As'vamedhaparvan* 73.27: Arjuna is called maha_ratha), the horse which is destined for the medha and which crosses into the territories of the neighbouring kings runs ahead of the young warriors' chariots, so runs Dadhikra_van in RV 7.44.4 agre ratha_na_m...in the As'vamedha, the horse represents the swift solar horse, who is the kinsman of the gods. a_tma_nam te manasa_ra_d aja_na_m avo diva_patayantam patam.gam s'iro apasyam pathibhih sugebhir aren.ubhir jehama_nam patatri: thus a sacrificial horse is addressed. (RV 1.163.6)...What is true of Dadhikra_van is true also of Daurgaha, called thus probably after the donor, and of Ta_rks.ya (RV 10.178) who had won thousands for his lord...during the As'vamedha, the body-guards accompanying the horse are instructed to 'reside in the kula of a rathaka_ra (A_pS'S 20.5.18; S'Br 13.4.2.17; KS'S 20.2.16...AV 3.5.6 shows that these are a special group of people in the kingdom, whose help is sought by the king: ye dhi_va_no rathaka_ra_h karma_ra_ ye mani_s.in.ah upasti_n parn.a mahyam tvam sarava_n kr.n.v abhito jana_n" [Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, p. II: 346, 331].

In the chariot race conducted in honour of Su_rya, the As'vins riding on their chariot drawn by donkeys, become the winners. (The offerings for the As'vins during the Sautra_man.i_ include the 'red he-goat' loho'jah (S'S'S 15.2; KS'S 19.3.2; in As'vamedha, the animals assigned to them are: s'uddhava_la, sarvas'uddhava_la and mani.va_la: TS 5.6.13). The chariots are madhuvarn.a, madhuva_hana; ABr 4.9.5; in Va_japeya (i.e. Soma, the drink of victory), the hiran.yapa_tra, golden bowl is filled with Madhu -- associated with the As'vins TS 5.7.3; TBr. 1.3.3.7; S'Br. 5.1.2.19; 5.28; Avesta notes a golden bowl in Yasna 10.17; the horses get to drink or smell Madhu; Mahi_dhara annotates Madhu: naiva_racarulaks.an.am madhuram havih -- VS10.18; KS'S 14.3.10; 4.12; As'vins caused a hundred pots of Sura_ or Madhu to flow out of the hoof of a horse). Donkey is the animal of the As'vins: RV 8.85.7. (In Pa_raskara Gr.hya Su_tra 8.15, the donkey is addressed as s'u_dro si s'u_drajanma_; s'u_dra is ks.udraka, worker in miniature beads).

S'Br (5.1.1.6ff.) and KS'S (14.1.1 ff.) elaborate on the Va_japeya autumn festival, which is akin to As'vamedha and Maha_vrata as a folk-custom cherished in Vedic times. [See Weber, 'Über den Va_japeya, SBKPAW -- *Sitzungsberichte der Königl. Bayerischen Akademie der Wissenschaften*, 1892).

Vis.n.u is associated in the Soma yajn~a with the Havirdha_na cart with the mantra, 'may Vis.n.u mount you', the sacrificer climbs up over the southern wheel. A_pS'S 11.8.1 ff. contain mantras which are recited at the individual parts of the cart or of the hut; offerings are made on both the wheel tracks of the cart with verses addressed to Vis.n.u (A_pS'S 11.6.13). During the Va_japeya he says to the cart: *vis.n.oh kramo'si* (TS 1.7.7). The soma stones, boards and resonance holes and the skin on which the pressing is done belong to Vis.n.u (A_pS'S 11.11.6; 12.2.15); Dron.a kalas'a is Vis.n.u's body (A_pS'S 12.18.20).

During the Va_japeya and Ra_jasu_ya, the war-chariot is addressed as Indra's thunderbolt. (VS 10.21; KS'S 14.3.1.2; see Weber, Ra_jasu_ya, p.56, n.3; Indra hurls it at Vr.tra, it splits into three: 'one-third becomes the sphyvah, one-third the ratha, one-third the yu_pa' (TS 5.2.6.2). Other Vedic weapons: paras'u, svadhiti, an:kus'a hanman, vartani_ (called tejis.t.ha_ in RV 1.53.8; cakra RV 1.53.9 with the addition of rathya), bones of Dadhyan~c (RV 1.84.13), bow and arrows (dhanus, bunda_is.u, s'aru, sena_). Tvas.t.r. is the fashioner of the thunderbolt.

The rules from KS'S:

14.1.16: "one should buy for a piece of lead the Parisrut (?Sura_; see S'Br. 5.1.2.14, parisrut is neither Soma nor Sura_), or the ingredients required for it (grasses, germinated grains, roasted grains, yeast: s'as.patokma_la_ja_nagnahusam.jn~a_na_m krayan.am... comm. on VS 13.13 equates s'as.pa with navapraru_d.havri_hi; tokma with navapraru_d.hayava) from a long-haired man to the south of Soma.

17. "The Nes.t.r. enters through the southern door, cooks on the southern fire and brings the Sura_ to the back part of the hut. [Sura_ is, apparently, not allowed to ferment].

26. 'At the time when the Ekadhana_ waters are brought, the Nes.t.r. fetches the Sura_ in from behind and puts it on the earth-mound.

27. 'Through a small opening (made to the south of the Havirdha_na) he fetches the Sura_graha vessels and cleans the Sura_ with a horse's hair in a (big) vessel.

14.2.3. 'The Adhvaryu draws seventeen Somagrahas.

4. 'And the Nes.t.r. the same number of Sura_grahas.

6. 'The Grahas should not be carried above the axle of the cart.

7. 'The Adhvaryu holds the Grahas high over the axle, the Nes.t.r. holds his deep below it with the words: 'you are united'.

8. 'They withdraw them again with the words, 'you are separated.' Thereupon follows the drawing of the honey-graha..."

[Alfred Hillebrandt, 1927, *Vedische Mythologie*, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, pp.I: 322-324].

Piggott notes that wheeled carts were found in northwestern Caucas, central and eastern Europe from mid-4th millennium BC. Ceremonial wagon burials under kurgans (or barrows) is noticed from eastern Bulgaria to the Volga. (Piggott, S., 1992, *Wagon, Chariot and Carriage*, London, Thames and Hudson). Anthony notes a 'semantic field' that two words for wheel, axle, yoke pole, wagon riding derive from PIE roots into Indo-European languages. (Anthony, D.W., 1990, The archaeology of the Indo-European origins, *Journal of Indo-European Studies*, 19: 193-222; Migration in Archaeology: The Baby and the Bathwater, *American Anthropologist* 92: 895-914).

Ra_jasu_ya and the 'ratha' imagery

The eka_has (or one-day Soma yajn~as) constitute the principal rituals of Ra_jasu_ya. When a king performs this sacrifice, he is the yajama_na of the yajn~a. A principal treatise is that of A. Weber, 1893, *Über die Königsweihe, den Ra_jasu_ya, Abhandl. der Preuss. Ak. der Wiss.*, Berlin.

The imagery offered by a Soma yajn~a called pra_yan.i_ya indicates the underlying metaphor of many of the bra_hman.a texts; this is the context in which the metaphor related to 'ratha' should be interpreted; the 'ratha' is a vehicle for the yajn~a, which is a journey 'to the world of heaven' (PB 4.2.2; KS 23.8: 83.8)

The journey

"Pra_yan.i_ya- is often to be met with as the designation of the introductory rite to a sacrifice or sacrificial session; the agnis.t.oma, for

instance, opens with a pra_yan.i_ya is.t.i, likewise the year-long Soma sacrifice begins with a pra_yan.i_ya Soma day...The word pra_yan.i_ya, however, not only denotes the introduction to a sacrificial session or a festival, but is also associated with the idea of going to heaven: 'Through the 'proceeding-day (pra_yan.i_ya) the gods proceeded (pra_yan) to the world of heaven: because they proceeded, therefore it is called the proceeding-day...through the udayani_ya (concluding rite) the sacrificer is supposed to reach the earth again... (pp.12-14)

ks.attr. or taks.a-rathaka_ra [charioteer, equerry (su_ta)/carpenter or cart-maker (taks.aka)] a ratnin [In TS, TB, sam.grahi_tr. is also a charioteer or collector; an indication that the 'ratha' is a passenger vehicle]

"Ratnin offerings (ratni_na_m havi_m.s.i)...a series of is.t.is sets in, which are performed each in the house of one of the ratnins -- dignitaries and members of the royal household, bearers of the royal treasures...(one of the ratnins, according to Maitra_yan.i Sam.hita_ is ks.attr, charioteer, equerry (referred to as taks.a-rathaka_ra in Hiran.yakes'i Gr.hyasu_tra; others are: brahman, ra_jan, mahis.i_, parivr.kti, sena_ni_, sam.grahi_tr., su_ta, vais'ya-gra_man.i_ and bha_gadugha)...the TB states that the ratnins are the givers and takers of the realm (prada_ta_rah; apa_da_ta_rah),'they extend to him the realm'...The MS calls them the 'limbs' (an:ga) of dominion (ks.attra)(TB 1.7.3.1; MS 4,p.47.3)...(pp.48-51)

Symbolism of removing 'lead' and 'copper' to yield gold, silver (soma, electrum!)

"Abhis.ecani_yah...the unction will be administered to the king while standing upon a tiger skin...When treading upon the tiger skin the sacrificer kicks away two pieces of metal. With the right foot he kicks a piece of lead towards a eunuch (kli_ba, TB,pan.d.aga, MS)...removed (by offering) are the biters

(dandas'u_ka)'. With the left foot he kicks a piece of copper towards a barber (kes'ava_pa) saying 'cast away is Namuci's head'. The eunuch and the barber throw the pieces outside the vedi (A_p.)...The adhvaryu places under the sacrificer who is standing on the tiger skin a silver plaque weighing a hundred ma_nas, with the formula: 'thou art ambrosia; from death protect me'. On the head of the sacrificer he places a golden plaque also weighing a hundred ma_nas (or kr.s.n.alas) with the formula, 'from the thunderbolt protect me'. This gold plaque is pierced with nine or with a hundred holes...(pp.106-108)

"...in the RV, we are told that the sura_ was extracted from Namuci by the As'vins to cure Indra, disintegrated by his indulgence in Soma. In another version of the Namuci myth Indra slays or twists off the head of Namuci who had insinuated himself into Indra's intimacy and forced Indra to enter into a covenant with him, with a weapon made of foam (apa_m phena); now foam is considered identical with lead...so much seems sure that Namuci in the sura_ cycle, as the restrainer who must be slain to release the invigorating fluids, plays the same part as Vr.tra in the Soma cycle... (pp. 109-110).

The Chariot Drive: the metaphor: 'ratha' is a weapon, associated with royalty, it is drawn by horses; it is also a metaphor for 'time'.

"After the unction rites (abhis.ekah) a chariot drive, combined with a raid on a cow herd, takes place. According to Baudha_yana, who in this respect copies the va_japeya, the chariot drive has the character of a race, in which several competitors take part...The chariot, placed on a transport cart (rathava_hana), is standing at the SE corner of the maha_vedi (Baudh., Ka_tya_yana S'rautasu_tra). While the adhvaryu says the formula: 'Thou art the Vr.tra killing bolt (vajra) of Indra, with these may he slay his foe (Vr.tra)', the chariot is taken down. Then it is moved to the uttaravedi and the horses are bathed... (pp.127-128)

"With the formula, 'at the instigation of the Maruts may I conquer', the drive begins. During his drive the sacrificer raids a ks.atrīya armed with a bow...the central moment is the raid on a herd of a hundred or more cows...'standing on the chariot, bolt in hand, dost thou keep the reins of the good steeds'...After the return of the chariot A_pastamba makes the sacrificer touch his wife (or the horses) with the bow's end with the same formula as the one used in putting down the chariot from its stand...'This bolt is highly force-winning (va_jasa_tama); through it let our son win force (va_ja)... (pp.129-130)

"Baudha_yana splits the whole episode in two parts: first the adhvaryu performs the drive symbolically; then the actual race takes place...During the race drums are beaten and cries (of victory) resound. As an anumantran.a to these cries the adhvaryu says, 'make the voices resound for Indra, make Indra win the force (va_ja), Indra has won the force... (pp.131-132).

"The chariot course belongs wholly to the sphere of the rites connected with the passing of the year...The chariot is in harmony with the number of the seasons of the year: three horses, the chariot itself, the charioteer and the chariot fighter, making together six, the number of the seasons. (TB 1.7.9.1-2; cf. AV 8.23 where the chariot is identified with the year. The parts of the chariot are also identified with the elements of the cosmos: AV 8.8.22; also cf. TB 1.3.6.4)... After the king has alighted from the chariot and ceremonially lowered his arms, his enthronement, combined with a game of dice, takes place...the priests and the ratnins sit down round the sacrificer on the throne. (Ma_nava S'rautasu_tra excludes here from the ratnins the carpenter (taks.an) and the chariot-maker)... (pp. 133, 140-141)

(J.C. Heesterman, 1957, *The ancient Indian royal consecration: the ra_jasu_ya described according to the Yajus texts and annotated*, Sgravenhage, Mouton & Co.)

Pan.i, Vala, daks.in.a_: winning cows, horses and gold

इन्द्रो वलं रक्षितारं दुधानां करेणैव वि चकर्ता रवेण ।
स्वेदाङ्गिभिर् आशिरम् इच्छमानो ऽरोदयत् पुणित् आ
गा अमुष्णात् ॥

(a_ya_sya a_n: girasa) 10.067.06 Indra with his voice as with an (armed) hand clove Vala the defender of the kine; desirous of the mixture (of milk and Soma) he with (the Maruts)k, who were shining with perspiration, destroyed Pan.i and liberated the cows. [Shining with perspiration: dripping ornaments, or having streaming ornaments, ks.arada_bharan.aih].

This r.ca seems to indicate that Vala is a Pan.i. Indra made the Pan.i weep and stole Vala's cows.

अध्वर्यवो यो दृभीकं जघान यो गा उदाज्जद् अप हि
वलं वः ।

तस्मा एतम् अन्तरिक्षे न वातम् इन्द्रं सोमैर् ओर्णुत
जूर न वस्त्रैः ॥

[gr.tsamada (a_n: girasa s'aunahotra pas'ca_d) bha_rgava s'aunaka] 2.014.03 Priests, offer this libation, which, like the wind in the firmament, (is the cause of rain), to him who slew Dr.bhi_ka, destroyed Bala, and liberated the cows; heap Indra with Soma, as an old man (is covered) with garments. [Dr.bhi_ka, an asura].

This r.ca notes that Indra drove out the cows and opened Vala. In RV 1.62.4 Indra performs this act of opening the stall in the presence of Navagva-s and Das'agva-s.

सखा ह यत्र सखिभिर् नवग्वैर् अभिज्ञव् आ सत्वभिर्
गा अनुगमन् ।

सत्यं तद् इन्द्रो दशभिर् दशग्वैः सूर्यं विवेद तमसि
क्षियन्तम् ॥

(vis'va_mitra ga_thina) 3.039.05 A friend, accompanied by the faithful friends who had celebrated the nine months rite, and tracking the cows upon their knees, and in like manner accompanied by those ten who had accomplished the ten months' rite, Indra made manifest the true (light of the sun) (theretofore) dwelling in (the) darkness (of the cave). [The faithful friends: the an:girasas; ten months' rite: navagvah and das'agvah].

In this r.ca, Indra is shown as chasing the cows with Navagva-s and as finding Su_rya with the Das'agva-s.

त्वं सौम पणिभ्य आ वसु गव्यानि धारयः ।

तुतं तन्तुम् अचिक्रदः ॥

(asita ka_s'yapa or devala ka_s'yapa) 9.022.07 You, Soma, hold the wealth of kine which you have won from the Pan.is, you have called aloud at the outspread sacrifice.

The wealth in cows held by the Pan.i-s is taken by Soma.

अयम् उशानः पयर् अद्रिम् उस्त्रा ऋतधीतिभिर्
ऋतयुग् युजानः ।

रुजद् अरुगणं वि वलस्य सानुम् पणीवचोभिर् अभि
योधद् इन्द्रः ॥

पदा पणीअराधसो नि बाधस्व महाअसि ।

नहि त्वा कश्चन प्रति ॥

(raga_tha ka_n.va) 8.064.02 Crush with your foot the pan.is who offer no oblations; you are mighty; there is none else like unto you. This r.ca notes that Pan.i offer no oblations.

न रेवता पणिना सख्यम् इन्द्रो ऽसुन्वता सुतपाः सं
गृणीते ।

आस्य वेदः खिदति हन्ति नयं वि सुष्वये पक्तये
केवलो भूत् ॥

(va_madeva gautama) 4.025.07 (Indra), the drinker of the effused Soma, contract no friendship with the wealthy trader who offers not any libation; he takes away his wealth; destroys him when destitute; but he is a special (friend) to him who presents the libation and oblation.

This r.ca notes that Pan.i, the wealthy trader, does not press Soma.

यम् इन्द्र दधिषे त्वम् अश्वं गाम् भागम् अव्ययम् ।

यजमाने सुन्वति दक्षिणावति तस्मिन् तं धेहि मा
पणौ ॥

(rebha ka_s'yapa) 8.097.02 Those horses, those cows, that imperishable wealth which you have seized (from your enemies)-- bestow them on the sacrificer who offers the Soma and is liberal to the priests-- not on the niggard.

This r.ca notes that Pan.i are the opposite of yajn~ika_s who offer oblations.

अगस्त्यस्य नद्वयः सप्ती युनक्षि रोहिता ।

पणीन् न्य अक्रमीर् अभि विश्वान् राजन् अराधसः ॥

(agastya-bhagini_) 10.060.06 Yoke the two red horses to your chariot, for the nephews of Agastya, and overcome, ra_ja_, all the niggard withholders of oblations.

This r.ca notes that Pan.i are miserly. [M. Bloomfield, 1916, Rig-veda repetitions, vol. 20, Cambridge, Harvard Oriental Series, p. 287: the following are listed as synonyms of pan.i: as'raddha_, apr.n.ai, ayajn~a_, ayajyu, aditsant, ara_van, kr.s'a, ada_suri, ayajvan, asunvant, kava_ri, ada_s'vas, asus.vi, adevayu, adevayant, anindra_).

न्य अक्रतून् ग्रथिनौ मृध्रवाचः

पणीअश्रद्धाअवुधाअयज्ञान् ।

प्रभप्र तान् दस्यूअग्निर् विवाय पूर्वश

चकारापराअयज्यून् ॥

(vasi.s.t.a maitra_varun.i) 7.006.03 May Agni utterly confound those Dasyus who perform no (sacred) rites, who are babblers defective in

speech, niggards, unbelievers; not honouring (Agni), offering no sacrifice; Agni preceding, has degraded those who institute no sacred ceremonies. [Bloomfield, M., 1896, Contributions to the interpretation of the veda, in: *American Journal of Philology*, 17: 412: '...the epithet as'raddha_ 'devoid of s'raddha_' used of the Pan.is in RV 7.6.3 amounts in the end to their characteristic designation 'stingy.'...(there is a) frequent juxtaposition of s'raddha...with yajn~a, or derivatives of the roots yaj and hu... with daks.in.a_ and the root da...']

This r.ca notes the Pan.i are ayajn~a_ (not offering oblations), saakratu (without spiritual insight), grathin (false), mr.dhrava_c (speak contemptuously or speech of a foe), as'raddha_ (without faith), avr.dha_ (not strengthening the deva by the oblations)

Sa_yan.a: RV 1.093.04 Agni and Soma, that prowess of yours, by which you have carried off the cows that were the food of Pan.i, is (well) known to us; you have slain the offspring of Br.sya and you have obtained the luminary (the sun), for the benefit of the many. [Br.sayasya s'es.a = Br.saya's a_patya, offspring (Nirukta, 3.2); Br.saya = Tvas.t.a_, an asura. The offspring of Tvas.t.a_ is Vr.tra. The agency of Agni and Soma in his death is explained by identifying them with the two vital airs, pra_n.a and apa_na, the separation of which from Vr.tra was the possible cause of his death (Taittiri_ya Sam.hita_ 2.5.2.4). By the destruction of Vr.tra, the enveloping cloud or gathered darkness, the sun was enabled to appear in the sky].

If Br.saya was a Pan.i, the r.ca RV 10.108.01 explains how the wandering merchants move to far off lands, crossing the Rasa_, the north-western portions of the River Sarasvati_, into the Gandha_ra region.

किम् इच्छन्तीं सरमा प्रेदम् आनङ् दूरे ह्य अध्वा जगुरिः पराचैः ।

कास्मेहिंतिः का परितक्म्यासीत् कथं रसाया अतरः पर्यासि ॥

इन्द्रस्य दूतीर् इषिता चरामि मह इच्छन्तीं पणयो निधीन् वः ।

अतिष्कदौ भियसा तन् न आवत् तथा रसाया अतरम् पर्यासि ॥

कीदृङ् इन्द्रः सरमे का दृशीका यस्येदं दूतीर् असरः पराकात् ।

आ च गच्छान् मित्रम् एना दधामाथा गवां गोपतिर् नो भवाति ॥

नाहं तं वेदु दभ्यं दभत् स यस्येदं दूतीर् असरम् पराकात् ।

न तं गृह्णन्ति स्रवतौ गभीरा हुता इन्द्रेण पणयः शयध्वे ॥

इमा गावः सरमे या ऐच्छः परि दिवो अन्तान् सुभगे पतन्ती ।

कस् त एना अव सृजाद् अयुध्व्य उतास्माकम् आयुधा सन्ति तिग्मा ॥

असेन्या वः पणयो वचांस्य अनिष्वयास् तन्वः सन्तु पापीः ।

अधृष्टो व एतवा अस्तु पन्था बृहस्पतिर् व उभया न मृळात् ॥

अयं निधिः सरमे अद्रिबुधो गोभिर् अश्वेभिर् वसुभिर् न्यूष्टः ।

रक्षन्ति तम् पणयो ये सुगोपा रेकु पदम् अलकम् आ जगन्थ ॥

एह गमन् ऋषयः सोमशिता अयास्यो अङ्गिरसो नवग्वाः ।

त एतम् ऊर्वं वि भजन्त गोनाम् अथैतद् वचः पणयो
वमन् इत् ॥

एवा च त्वं सरम आजगन्थ प्रबाधिता सहसा दैव्येन ।
स्वसारं त्वा कृण्वै मा पुनर् गा अप ते गवां सुभगे भ
जाम ॥

नाहं वैद भ्रातृत्वं नो स्वसृत्वम् इन्द्रो विदुर अङ्गिरसश्
च घोराः ।

गोक्रामा मे अच्छदयन् यद् आयम् अपात इत पणयो
वरीयः ॥

दूरम् इत पणयो वरीय उद् गावो यन्तु मिनतीर्
ऋतेन ।

बृहस्पतिर् या अर्विन्दुन् निगूळ्हाः सोमो ग्रावाण्
ऋषयश् च विप्राः ॥

(pan.i-asura samu_ha) 10.108.01 (The Pan.is). With what intention has Sarama_ come to this place? Verily the way is long and difficult to be traversed by the persevering. What is the motive of your coming to us? What sort of wandering was yours? How have you crossed the waters of the Rasa_? [Legend: The cows of Br.haspati had been stolen by the Pan.is, the followers of the Asura Vala. At Br.haspati's instance, Indra sent Sarama_ in search of the cattle. She having crossed a large river arrived at Vala's stronghold and discovered the cattle. The Pan.is trying to make friends with her, the dialogue contained in this su_kta then ensued. rasa_: the river of the firmament].

10.108.02 (Sarama_). I come, the appointed messenger of Indra, desiring, Pan.is, your great hidden treasures; through fear of being crossed the (water) helped us, thus I passed over the waters of the Rasa_.

10.108.03 (The Pan.is). What is Indra like, O Sarama_? What is the appearance of him as whose messenger you have come to this place from afar? (They then say to one

another:) Let her approach; let us make friends with her, and let her be the lord of our cattle.

10.108.04 (Sarama_). I do not believe that he can be subdued; he as whose messenger I have come to this place from afar subdues (his enemies). The deep rivers do not conceal him; you, Pan.is, slain by Indra, will sleep (in death).

10.108.05 (The Pan.is). These are the cows which you, auspicious Sarama_, coming to the extremities of the sky, demand. Who will give them up to you without a combat? And our weapons are sharp.

10.108.06 (Sarama_). Your words, Pan.is, are not in the place of armies; your sinful bodies will not be equal to arrows. Let your path be difficult to follow, let Br.haspati show no favour to either (your words or your persons). [Armies: asenya_ = sena_rha_n.i na bhavanti, your words are not equal to armies, i.e., your words are not to be feared; anis.avyah = is'varha_n.i na santu para_kramara_hityena, let them not be equal to arrows through your absence of prowess].

10.108.07 (The Pan.is). This treasure, Sarama_, secured in the mountain is composed of cows, horses and riches; the Pan.is protect it who are good watchers; you have come to this lonely spot in vain. [Lonely = resounding with the lowing of the oxen].

10.108.08 (Sarama_). Excited by the Soma, the R.s.is, the An:girasas of the nine months' rite, headed by Ayasya, will come here; they will partition this herd of cattle, then the Pan.is will retract their words. [Headed by Ayasya: or, unwearying; will retract their words: lit., vomit, i.e., reject].

10.108.09 (The Pan.is). You have indeed come here, Sarama_, constrained by divine power; we will make you our sister, do not return, we will share the cattle with you auspicious one.

10.108.10 (Sarama_). I recognize not fraternity nor sisterhood; Indra and the terrible An:girasas know (my kindred); my (masters) desiring the cattle overshadowed (yoru habitation) when I came; depart hence, Pan.is to a distant (spot).

10.108.11 Go hence, Pan.is, to a far-off distant (spot), let the cattle come forth in due order bursting through (the door) the concealed cattle

which Br.haspati, the Soma, the grinding stones and the wise R.s.is have found.

This su_kta is referred to in Nirukta 11.25: “there is a legend that the bitch of the gods (i.e. Sarama_) sent forth by Indra, conversed with the asura-s called Pan.i.” (L. Sarup, 1967, *The Nighan.tu and the Nirukta*, ed., tr., repr., Varanasi, p.177). Pan.i samu_ha have withheld cows, horses and other riches in a mountain (or rock) (RV 10.108.7). This mountain is on the other side of the River Rasa_ (10.108.1,2). Pan.i would not part with their wealth without a fight (10.108.5) but were prepared to make Sarama_ their cowherd (10.108.3) or make Sarama_ a sister (10.108.9). In RV 10.108.6, Sarama_ tells the Pan.i that the words of asura-s or Pan.i’s are no weapons (even though **Pan.i claim that their weapons are sharp, a_yudha_ santi tigma_**: 10.108.5). Sarama_ also declares: Br.haspati in association with Soma, the Pressing stones and the wise R.s.i-s will let the cows come out (10.108.11). The wealth of cattle will be divided among the R.s.i-s, Aya_sya (may also be an epithet of Indra or Br.haspati), An: girasa-s and Navagva-s (10.108.8).

The phrase used in RV 10.108.6 is asenya_vah pan.ayo va_ca_m.si anis.avya_s tanvah santu pa_pi_h (Alt. Trans.: Your words are no weapons, O Pan.i. Though your evil bodies may be immune to arrows...). RV 1.81.2 refers to Indra as vi_ra senyo. In AV 6.99.2 senya vadha_ is translated as ‘hostile weapons’. Thus asenya_ is interpreted as ‘weak, feeble’. (M. Bloomfield, 1917, Some cruces in Vedic text, grammar and interpretation, *American Journal of Philology* 38,:11-13).

RV 10.108.6 refers to the nidhi of the Pan.i-s. This nidhi consists of go_, as’va and vasu.

ईशानासो ये दधते स्वर णो गोभिर् अश्वैभिर् वसुभिर् हिरण्यैः ।

इन्द्रवायू सूरयो विश्वम् आयुर् अर्वाद्भिर् वीरैः पृतनासु

सह्युः ॥

(vasis.t.ha maitra_varun.i) 7.090.06 May those munificent princes who confer upon us prosperity by gifts of cattle, horses, treasure, gold, overcome, Indra and Va_yu, the entire existence (of their enemies) in contests with horses and with heroes. [Treasure: vasubhih = hiran.yaih, gold causing us to be settled, niva_sakaih].

The r.ca 7.90.6 repeats the definition of nidhi: it consists of go_, as’va and vasu (cattle, horses and gold). Hiran.ya is included in the list of items desired by the priests as daks.in.a_.

दक्षिणाश्वं दक्षिणा गां ददाति दक्षिणा चन्द्रम् उत यद् धिरण्यम् ।

दक्षिणान्नं वनुते यो न आत्मा दक्षिणां वर्म कृणुते विजानन् ॥

(divya a_n: girasa or daks.in.a_ pra_ja_patya) 10.107.07 Daks.in.a_ gives horses, daks.in.a_ gives cows, daks.in.a_ gives gold and also silver, Daks.in.a_ bestows food. Our spirit discriminating (all things) puts on daks.in.a_ for armour.

Thus nidhi which includes cattle, horses and gold is also equivalent to daks.in.a_ which includes: cattle, horses and gold/silver.

The r.ca-s RV 10.108.1,2 refer the River Rasa_. Keith and Macdonell (*Vedic Index* II, p. 209) note that Rasa_ is a ‘mythic stream at the ends of the earth, which as well as the atmosphere it encompasses.’ Mayrhofer (*KEWA* 18, p. 48) notes that epic and pura_n.a-s refer to rasa_-tala as the lower world.

परि णः शर्मयन्त्या धारया सोम विश्वतः ।

सरा रसेव विष्टपम् ॥

(medhya_tithi ka_n.va) 9.041.06 Flow round us, Soma, on all sides in a bliss-bestowing stream, like a river down a steep place. [Or, as the earth (is surrounded) with water].

This r.ca seems to indicate that Rasa_ may be a heavenly stream. (SS Bhavē, 1950, *The Soma-hymns of the R.gveda, Part II in: MS Univ. of Baroda Research Series 5*, Baroda, p. 81).

Rasa_

A number of r.cas contain the morphem, 'rasa_' and in most of the r.cas, it is interpreted as a '(flowing) stream'. The exceptions are as follows:

In r.cas 5.53.9 and 10.75.6, rasa_ is used in the context of a list of names of rivers.

In r.cas 10.108.1 and 2, the rasa_ is explained in the context of Sarama_ and Pan.is. [The Pan.is ask Sarama_: How have you crossed the waters of the Rasa_?]

In r.ca 10.121.4, the snow-clad mountains are described as the ocean with rivers (rasa_ya).

A parallel is often drawn with the Avestan mythical river named Ranha_ (Vd. 1.19).

A mythological explanation is that rasa_ represents a border river emanating from snow-clad mountains. Sarama_ denotes the rays of the Sun and Pan.i (who are merchants) had stolen the cows and hidden them in caves. The legend is that Sarama_ rescues the cows from the Pan.is.

याभी रसां क्षोदसोदः पिपिन्वथुर् अनश्वं याभी रथम्
आवतं जिषे ।

याभिस् त्रिशोकं उस्त्रिया उदाजत ताभिर् ऊ षु उतिभिर्
अश्विना गतम् ॥

1.112.12 With those aids by which you filled the (dry) river-bed [rasa_ nadi_ bhavati rasateh s'abdakarman.ah] (Nirukta 11.25)] with water, by which you drove the chariot, without horses, to victory, and by which Tris'oka recovered his (stolen) cattle; with them, As'vins, come willingly hither. [Tris'oka was a r.s.i, the son of Kan.va].

सिन्धुर् ह वां रसया सिञ्चद् अश्वान् घृणा वयो

ऽरुषासः परि ग्मन् ।

तद् ऊ षु वाम् अजिरं चैति यानं येन पती भवथः

सूर्यायाः ॥

4.043.06 The flowing (stream) has sprinkled your steeds with moisture; the radiant horses (like) birds (in swiftiness) pass on, bright with lustre; well known as that quick-moving chariot, whereby you became the lords of Su_rya. [The flowing stream: sindhu, this may mean here, either water or a cloud].

पदेभपदे मे जरिमा नि धायि वरूत्री वा शक्रा या

पायुभिश् च ।

सिष्ठ माता मही रसा नः स्मत् सूरिभिर् ऋजुहस्तं

ऋजुवनिः ॥

5.041.15 My praise has been continually proffered as a protectress, powerful with (the means of) preservation; may the maternal and venerable earth accept our (praises), and, (pleased) with her pious (worshippers) be (to us) straight-handed, and the giver of good. [As a protectress: varu_tri_ = asmad upadravavarayitri_, what or who keeps off oppression upon us].

मा वो रसानितभा कुभा कुमु मा वः सिन्धुर् नि

रीरमत् ।

मा वः परि छात् सरयुः पुरीषिण्य् अस्मे ईत् सुन्नम्

अस्तु वः ॥

5.053.09 Let not the Rasa, the Anitabha_, the Kubha_, or the wide-roving ocean delay you; let not the watery Sarayu oppose you; may the happiness of your (approach) be ours. [Rasa, Anitabha_, Kubha_: names of rivers; the wide-roving ocean: kramuh sindhuh = sarvatra kraman.ah samudra, the every-where going ocean].

आ सुते सिञ्चत श्रियं रोदस्योर् अभिश्रियम् ।

रसा दधीत वृषभम् ॥

8.072.13 Drop into the milked (stream) the admixture, which reaches, (as it boils), heaven and earth; set the bull in the liquor. [Admixture: goat's milk which is poured into the cow's milk in the gharma; heaven and earth: the As'vins (Nirukta 12.1); bull in the liquor: vr.s.abha = bull, Agni; rasa = rase, liquor is the goat's milk. The goat is dedicated to Agni, hence the contact of its milk with fire is proper].

परि णः शर्मयन्त्या धारया सोम विश्वतः ।

सरा रसेव विष्टपम् ॥

9.041.06 Flow round us, Soma, on all sides in a bliss-bestowing stream, like a river down a steep place. [Or, as the earth (is surrounded) with water].

तृष्टमया प्रथमं यातवे सजुः सुसत्वा रसा श्वेत्या
त्या ।

त्वं सिन्धो कुभया गोमती कुमुम् मेहत्त्वा सरं याभिर्
ईर्यसे ॥

10.075.06 You, Sindhu, in order to reach the swift-moving Gomati_, have united, yourself first with the Tr.s.t.a_ma_; (now be united) with the Susartu, the Rasa_, the S'veti, the Kubha, and the Mehatnu, in conjunction with which streams you do advance. [In conjunction with: saratham = lit. having mounted the same chariot with them].

किम् इच्छन्ती सरमा प्रेदम् आनङ् दूरे ह्य अध्वा

जगुरिः पराचैः ।

कास्मेहिंतिः का परितक्म्यासीत् कथं रसाया अतरः

पयांसि ॥

इन्द्रस्य दूतीर् इषिता चरामि मह इच्छन्ती पणयो
निधीन् वः ।

अतिष्कदौ भियसा तन् न आवत् तथा रसाया अतरम्
पयांसि ॥

10.108.01 (The Pan.is). With what intention has Sarama_ come to this place? Verily the way is long and difficult to be traversed by the persevering. What is the motive of your coming to us? What sort of wandering was yours? How have you crossed the waters of the Rasa_? [Legend: The cows of Br.haspati had been stolen by the Pan.is, the followers of the Asura Vala. At Br.haspati's instance, Indra sent Sarama_ in search of the cattle. She having crossed a large river arrived at Vala's stronghold and discovered the cattle. The Pan.is trying to make friends with her, the dialogue contained in this su_kta then ensued. rasa_: the river of the firmament].

10.107.02 (Sarama_). I come, the appointed messenger of Indra, desiring, Pan.is, your great hidden treasures; through fear of being crossed the (water) helped us, thus I passed over the waters of the Rasa_.

यस्येमे हिमवन्तो महित्वा यस्य समुद्रं रसाया सहाहुः ।

यस्येमाः प्रदिशो यस्य बाहू कस्मै देवाय हविषा

विधेम ॥

10.121.04 Through whose greatness these snow-clad (mountains exist), whose property men call the ocean with the rivers, whose are these quarters of space, who are the two arms -- let us offer worship with an oblation to the divine Ka.

Sarama_

अपो यद् अद्रिम् पुरुहूत ददर् आविर् भुवत् सरमा

पूर्व्यं तै ।

स नो नेता वाजम् आ दर्षि भरि गोत्रा रुजन्

अङ्गिरोभिर् गृणानः ॥

4.016.08 Invoked of many, when you had divided the cloud for (the escape of) the waters, Sarama_ appeared before you; and you, the bringer of abundant food, have shown us

favour, dividing the clouds and glorified by the An:girasas.

अन्नोद् अत्र हस्तयतो अद्रिर् आर्चन् येन दश मासो
नवग्वाः ।

ऋतं यती सरमा गा अविन्दद् विश्वानि सत्याङ्गिराश्
चकार ॥

विश्वे अस्या व्युषि माहिनायाः सं यद् गोभिर् अङ्गिरसो
नवन्त ।

उत्स आसाम् परमे सधस्थ ऋतस्य पथा सरमा विदुद्
गाः ॥

5.045.07 At this sacrifice the stone (set in motion) by the hands (of the priests) makes a noise, whereby the nine-months ministrants celebrated the ten-months worship; when Sarama_, going to the ceremony, discovered the cattle, and An:giras rendered all the rites effective. [Ten-months worship: or, when the priests of both the nine and ten months rites offered worship; Sarama_: may signify either flowing, eulogistic, or sacred speech, s'aran.as'i_la_ stutiru_pa va_k, or, as usual, the bitch of Indra].

5.045.08 When all the An:girasas, on the opening of this adorable dawn, came in contact with the (discovered) cattle, then milk and the rest were offered in the august assembly, for Sarama_ had found cows by the path of truth.

इन्द्रस्याङ्गिरसां चेष्टै विदत् सरमा तनयाय धासिम् ।

बृहस्पतिर् भिनद् अद्रिं विदद् गाः सम् उस्त्रियाभिर्

वावशन्तु नरः ॥

1.062.03 When the search was set on foot by Indra and the An:girasas, Sarama_ secured food for her young; then Br.haspati slew the devourer and rescued the kine, and the gods, with the cattle, proclaimed their joy aloud. [Sarama_ agreed with Indra to go in search of the stolen cattle on condition that the milk of the cows should be given to her young ones. Br.haspati = Indra, the master of the great ones (br.hatam), the gods].
Pan.i

दासपत्नीर् अहिगोपा अतिष्ठन् निरुद्धा आपः पणिनेव
गावः ।

अपाम् बिलम् अपिहितं यद् आसीद् वृत्रं जघन्वाः

अप तद् ववार ॥

1.032.11 The waters, the wives of the destroyer, guarded by Ahi, stood obstructed, like the cows by Pan.is; but by laying Vr.tra, Indra set open the cave that had confined them.

आद् अङ्गिराः प्रथमं दधिरे वय इन्द्राग्रयः शम्या ये
सुकृत्यया ।

सर्वम् पुणेः सम् अविन्दन्त भोजनम् अश्वावन्तं

गोमेन्तम् आ पशुं नरः ॥

1.083.04 The An:girasas first prepared (for Indra) the sacrificial food, and then, with kindled fire, (worshipped him) with a most holy rite; they, the institutors (of the ceremony); acquired all the wealth of Pan.i, comprising horses, and cows, and (other) animals.

अस्य मदै स्वर्यं दा ऋतायापीवृतम् उस्त्रियाणाम्

अनीकम् ।

यद् धं प्रसर्गे त्रिकुं निवर्तद् अप द्रुहो मानुषस्य दुरो

वः ॥

1.121.04 In the exhilaration of the Soma, you have restored the celebrated herd of cattle, hidden (in the cave), for the sake of sacrifice, (to the An:girasas); when, Indra, the threefold crest engages in combat, he opens the doors of the tyrannical descendants of Manu [Threefold crest: elevated as a triple crest in the three worlds].

अधि ब्रुवुः पणीनां वर्षिष्ठे मूर्धन् अस्थात् ।

उरुः कक्षो न गाङ्ग्यः ॥

6.045.31 Br.bu presided over the high places of the Pan.is, like the elevated bank of the Ganges. [br.bu pan.i_na_m vars.is.t.he mu_rdhan adhyaatha_t = he stood over upon the high place, as if it were on the forehead of the Pan.is; mu_rdhavat ucchrite sthale; the Pan.is may be

either merchants or traders, or asuras, so termed; like the elevated bank of the Ganges: uruh kaks.o na ga_n:gyah = gan:ga_ya_h kule visti_rn.e iva_, as on the broad bank of the Ganges, that is, as the bank is above the bed of the river.

त्वं त्यत् षणीनां विदो वसु सम् मातृभिर् मर्जयसि स्व

आ दमं ऋतस्य

धीतिभिर् दमे ।

परावतो न साम तद् यत्रा रणन्ति धीतयः ।

त्रिधातुभिर् अरुषीभिर् वयौ दधे रोचमानो वयौ दधे ॥

9.111.02 You did discover the wealth of the Pan.is, and are washed in your own house at the sacrifice by the mothers, the supporters of the sacrifice; as the hymn (is heard) from afar, so it (is heard by all, the hymn) in which the supporters (of the rite) rejoice; the shining (Soma) with its brilliant (waters), the supporters of the three (worlds), gives food, gives food (to the worshippers). [By the mothers: the vasati_vari_waters].

दूरम् इत पणयो वरीय उद् गावो यन्तु मिनतीर्

ऋतेन ।

बृहस्पतिर् या अविन्दन् निगूळ्हाः सोमो ग्रावाण

ऋषयश् च विप्राः ॥

10.107.11 Go hence, Pan.is, to a far-off distant (spot), let the cattle come forth in due order bursting through (the door) the concealed cattle which Br.haspati, the Soma, the grinding stones and the wise R.s.is have found. [Alt. trans. (Hillebrandt, 1, p. 367): Go away from here, O Pan.is; the cattle vanishing away (among you) should come out according to the Law -- the cattle which Br.haspati, Soma, the Soma stones and the wise R.s.is found in the hide-out]. Hillebrandt also notes a parallel imagery with 'the stone flung by hand', the Navagvas and the An:giras' in the verses related to Sarama_ (RV 5.45.7,8).

Thus, remarkably, the Pan.i get personified as 'wealth' which has been found by Soma, the

processing of Soma and by the Soma-pressing priests. The Pan.i are also described in mythical terms in RV 1.32.11; 2.24.6; 6.44.22; 7.9.2; 10.67.6; 92.3.

Indra, trader, is celebrated in the Indra maha_ celebrations

Kaus'ikasu_tra (Atharvaveda) 140. 1-22 elaborates on the rules for the great festival in honour of Indra to be celebrated by kings. This is celebrated in the month Praus.t.hapada, in its light half or in the month As'vayuja, on the eighth day the entrance (of the tree into the place where it is to be erected, takes place). The erection takes place under S'ravan.a. The verses 16-17: 'After having at an enclosed place offered burnt offerings with (AV 3.15.1) "I (urge on) Indra, the trader; let him come to us, be our leader; thrusting away (the representative of) niggardliness, the waylayer, the wild animal; let him, the one in power, be a giver of wealth to me" (AV 7.84.2) "O Indra (unto) dominion), (unto) noble inaugurative power wast thou born, thou bull (chief) of the races of men; thou didst push away those people who behaved inimically; thou didst make room for the gods." "Like a fearful wild animal, roaming about, staying in the mountains, he may come hither from distant distance; having sharpened, O Inse, (thy) missile, (its) sharp edge, cleave the enemies in pieces, push away the adversaies" they must attend upon brahmans.'

MBh. notes (1.57.19 cr.ed.) that 'until the present day the best of kings have had the entrance of the pole performed.' The pole is jarjara, it is also vaijayanta (MBh. 3.43.8, to conquer defeat, vi-jayati; MBh 2.20.17: aindro vaijayanto gun.ah; jarjara also means, 'an old woman, decrepit'). Vis.n.udharmottarapura_n.a (2.154-157) states that it is a king's obligation to have the Indra festival celebrated since the erected pole is a destroyer of enemies and promises victory to the royalty. The text also elaborates on the social nature of the festivity involving decoration of the town, public

entertainment involving song and dance, worship of the divinity that takes residence in the pole (nityam ca juhuya_n mantra_n purodha_h s'a_kravais.n.ava_n: 2.155.21). The celebration also includes an indraya_ga (2.156.6). Vara_hamihira's Br.hatsam.hita_ (43.9 f.) gives the reasons for the festival: to make the king wealthy and victorious, to make the people obey the king's orders, to keep the people contented, safe and happy. It is also a means of foreboding the good or evil which awaits mankind. Ka_lika_pura_n.a (ch. 90, 46 f.) also prescribed the recitation of the r.ca RV 6.47.11 dear to Indra at every offering and every act of worship. (= AV 7.86; tra_ta_ram iti mantro'yam va_savasya priyah parah). [Meyer tries to identify Indra's dhvaja with the European Johannis but admits that the festivities in Bha_rata as seen from the ancient texts was free from sexual debauchery which characterizes the European festivities connected with the Midsummer Day: Meyer, J.J., 1937, *Trilogie altindischer Machte und Feste der Vegetation*, Zurich-Leipzig, III, p. 104, 191 f.; cf. resume in: O. Viennot, 1954, *Le culte de l'arbre ans l'Inde ancienne*, Paris, p. 93 ff.]

त्रा॒ता॒रम् इन्द्र॑म् अ॒वि॒ता॒रम् इन्द्र॑ ह॒वै॒भ॒ह॒वे सु॒ह॒वं श॒रम्
इन्द्र॑म् ।

ह॒वामि॑ श॒क्रम् पु॒रु॒हू॒तम् इन्द्र॑ स्व॒स्ति नो॑ म॒घ॒वा धा॒त्वा
इन्द्र॑ः ॥

(garga bha_radva_ja) 6.047.11 I invoke, at repeated sacrifice, Indra, the preserver, the protector, the hero, who is easily propitiated, Indra, the powerful, the invoked of many; may Indra, the lord of affluence, bestow upon us prosperity.

Bhavis.yapura_n.a (2.2.8.88 ff.) adds another mantra RV 1.22.20 (= AV 7.26.7) to be recited to expiate ominous events (Vis.n.u's highest step is seen like an eye fixed on the sky):

तद् वि॒ष्णोः प॒र॒मम् प॒दं सदा॑ पश्यन्ति॒ सूर॑यः ।

दि॒वी॒व चक्षु॑र॒ आ॒त॒तम् ॥

(medha_tithi ka_n.va; devata_: vis.n.u) 1.022.20 The wise ever contemplate that supreme station of Vis.n.u, as the eye ranges over the sky. [paramam padam = supreme degree or station, svarga].

[J. Gonda, 1967, The Indra festival according to the Atharvavedins, in: *Journal of the American Oriental Society*, Vol. 87, No. 4, October-December 1967, pp. 413-429].

Many Mesolithic and Neolithic sites have been discovered all over Bha_rata. [After KB Lal, 1997].

The r.ca 5.30.9 refers to the two women, who are made into Namuci's weapons:

स्त्रियो॑ हि दा॒स आयु॑धानि च॒क्रे किम् मा॑ कर॒न् अव॒ला
अ॒स्य से॒नाः ।

अ॒न्तर् ह्य॒ अ॒ख्य॑द् उ॒भे अ॒स्य धे॒ने अथो॑प॒ प्रैद् यु॒धये
द॒स्युम् इन्द्र॑ः ॥

5.030.09 The slave (Namuci) made women his weapons what will his female hosts do unto me? The two his best beloved, (Indra) confined in the inner apartments, and then went forth to combat against the Dasyus. [What will his female hosts do unto me? Indra is supposed to say this; the two his best beloved: decapitation of Namuci by Indra is related in the gada_section of the S'alya parva of the Maha_bha_rata; Namuci through fear of Indra, took refuge in the solar rays; Indra promised that he would not harm him if he came forth, but broke his promise, and, on Namuci's issuing forth, cut off his head; by this he incurred the guilt of brahmanicide, for, Namuci was a brahman, but Indra was taught expiation of his sin by Brahma_].

["That the name contains a negative is assumed by Pa_n.ini (VI.3.75)...According to Halevy, Consider. crit., p.38, Namuci = Namik = Namitch, the form which the Turkish immigrants gave to Nami (= Ranha_)." (Hillebrandt, opcit., note 318, p. 359)].

Namuci possesses Soma (VS XX.59). Da_sa or Dasyu Namuci is mentioned in RV 6.20.6 and RV 5.30.3. Namuci is an asura in RV 10.131.4. ["The meaning of 'demons' is generally on the increase in the tenth book, hence, it is closer to the period of the Bra_hman.as. The hymns which refer to the Asuras in hostile sense provide thus a criterions to say that they belong to the Bra_hman.a-stratum, or, to put it more cautiously, to the groups whose notions were continued in the Bra_hman.as" Hillebrandt, opcit., note 83, p. 424, vol.II].

Arsenic was alloyed with copper to create hardened metal tools and weapons; an alloy which represents an early 'bronze'.

da_rumuca = white arsenic (Skt.lex.) Therefore, na-muci may be a negative formed to pinpoint a mineral substance, i.e. 'non-arsenic'; the reference of Namuci may be to 'white lead' in this semantic derivation, consistent with the association of Namuci with 'lead, plumbum' in the R.gvedic and later mythology. [cf.namak = salt (Pahlavi.Hindi); sindhu-lavan.a = rock salt (Skt.)]

nat.a, ku-nat.a, kulat.a_pati = red arsenic (Skt.) [A homonym might have been used in the Inscriptions of the civilization showing dancing persons].

a_la, nat.aman.d.ana, kanakarasa, harita_la, karbu_ra = yellow arsenic, orpiment (Skt.lex.)
godanta = a cow's tooth; a white mineral substance (apparently an earthy salt); yellow orpiment (Skt.lex.)

ka_ruja = a young elephant; an ant-hill; froth, foam; red orpiment; anything produced by an artist or mechanic (Skt.lex.)

s'ila_, manahs'ila_, kanat.i_, kunat.i_, kat.ambhara, na_gama_tr. = red arsenic (Skt.)
[The use of the compound na_gama_tr. is significant in the context of a r.ca referring to two women; the r.ca 5.30.9 refers to the two women, who are made into Namuci's weapons].
kumbhaka_ra = red arsenic (Skt.lex.)

a_varta, pyrites, marcasite, a mineral substance (Skt.lex.)

kut.ilam, lead ore, white lead; minnar-r-ar.ukku, van:kani_r-u, lead ore; ci_cam, ka_ri_yam, i_yaman.al, atan:kam, cira_viruttam, ci_ravat.t.am, yamune_t.t.akam, lead, plumbum; ket.uppinai, kot.ippin.ai, ko_lavan:kam, lead ore; caval.ai lead sand (Tamil.lex.)

sira_vr.tta, dha_tus'odhana, dha_tusambhava, vadhraka, lead; vayovan:ga, lead; mr.duka_rs.n.a_yasa 'soft (black) ore', lead; yamune_s.t.aka, lead; s'vetaran~jana, 'white coloured' lead; sindu_raka_ran.a, origin of minion, lead; sindu_rika_, red lead, minium; si_saja, minium, red lead; na_gaja, born, red lead, tin; na_garakta, red lead (Skt. lex.)

sura_ is a snake; also a spirituous liquor (Skt.lex.); na_ga is a snake; also lead (Skt.lex.) [Note: snake pictographs in the Harappan inscriptions].

na_kam black lead; zinc; prepared arsenic; sulphur; na_kacam, tu_riyam, vermilion, lead (Tamil.lex.) takaram tin, white lead; metal sheet coated with tin (Tamil.lex.) ka_kkaippon- a kind of tinsel, resembling gold lead, used for decoration at weddings and other festivals (Tamil. lex.)

na_ga m. a snake , (esp.) Coluber Naga S'Br. MBh.&c.; a Na_ga or serpent-demon (the race of Kadru or Su-rasa_ inhabiting the waters or the city Bhoga-vatil under the earth ; they are supposed to have a human face with serpent-like lower extremities [see esp. Nag. v , 17 RTL. 233 &c.] ; their kings are S'asha, Va_suki , and Takshaka ib. 323 ; 7 or 8 of the Na1gas are particularly mentioned MBh.

n.(m. L.) tin , lead Bhpr. ; a kind of talc ib.

madhu is a spirituous liquor; also pyrites Bhpr.; madhudha_tu, pyrites (Skt.lex.) [Note the association with the As'vins and use in the Soma purification process]. See also, ma_ks.ika_ a honey-like mineral substance or pyrites (MBh. Skt.lex.) Compounds: hema-, svarn.a-, suvarn.a-, pi_ta-ma_ks.ika, kam.sa-,

ka_msya-, ru_pya-ma_ks.ika; ma_ks.i_ka-dha+tu (Skt.lex.)

ma_nikai (?metath. namik) = spiritous liquor (Tamil.lex.)

The cognate of Ranha_ is Rasa_ (Skt.) It is significant, that this is a synonym of wine or grape, apart from being the name of a mythical stream: f. moisture , humidity RV. ; N. of a river ib. ; a mythical stream supposed to flow round the earth and the atmosphere ib. (Nir. xi , 23) ; the lower world , hell MBh.; the earth , ground , soil Ka_v. ; the tongue L. ; N. of various plants (Clypea Hernandifolia ; Boswellia Thurifera ; Panicum Italicum ; a vine or grape

rajata mfn. (cf. 2. %{Rjra}) whitish , silver-coloured , silvery, `` whitish gold "" i.e. silver) RV. TS. VS. ; silver , made of silver Br. A's'vS'r. ChUp. ; silver AV; gold ; a pearl ornament ; ivory ; blood ; an asterism ; N. of a mountain and of a lake. (Skt.lex.)

iracatam 1. naks2atra ; 2. tusk of an elephant; 3. whiteness; white colour; 4. garland of pearls; 5.white mountain silver mountain; 6. gold (Tamil.lex.)

Semant. (Skt.) phena, phen.a m. once and prob. connected with phaN; but see Un. iii , 3) foam , froth , scum RV. &c. &c. ; moisture of the lips , saliva Mn. iii , 19 ; n. (m. L.) Os Sepiae (white cuttle-fish bone , supposed to be indurated foam of the sea) Car.

muci-ttal to faint, become tired; 2. to be distressed; 3. to grow thin; 4. to perish; to wrench, twist [The semant. 'to grow thin' is a characteristic of tin which is used for coating metal sheets; is it possible that na-muci including a negative has been derived from this lexeme? Or, see mucī = name of a cakravartin (Skt.lex.); is na-muci some one opposed to a king, like an asura? cf. na_mi a name of Vis.n.u; nami = name of one of the 24 Jaina ti_rtha_n:kara]

The significance of the Namuci mythology becomes apparent in the context of words such as apa_m phena, si_sa, sura_, Sarasvati_ and the As'vins who heal Indra. RV 5.20.6 uses the term Nami_ Sa_pya (TMBr XXV.10.7 refers to him as a King of Videha) as an opponent of Namuci. As'vins are associated with parisrut and madhu. Thus, if interpreted as a bill of materials for the yajn~a, these are materials used in the removal of lead from the quartz to yield Soma, electrum. Lead is apa_m phena or panned lead from the river-bed; in metallurgical history, it is noted that lead as well as gold were panned from river-beds in ancient times. Lead has the colour of foam. Saravati_, the river is also called Hiran.yavartani_ and may represent the panned gold obtained from the river bed. [It is notable that a place called Lohar.gar.h, close to the Aravalli ranges, north of Adh Badri, on the banks of the River Somb and Sarasvati_ Nadi_ is even today licenced to gold-panners by the district administration of Yamunanagar Dist.]

अप॒ प्राच॑ इन्द्र॒ विश्वा॑अ॒मित्रा॑न् अपापा॑चो अभिभू॑ते
नुद॑स्व ।

अपो॑दी॒चो अप॑ शूराध॒राच॑ उ॒रौ यथा॑ तव॒ शर्म॑न्
मदै॑म ॥

कुवि॑द् अ॒ङ्ग यव॑मन्तो॒ यवं चि॑द् यथा॒ दान्त्य॑ अनुपूर्व॑
वि॒यूय॑ ।

इहे॑हैषां कृणुहि॒ भोज॑नानि॒ ये ब॑र्हिषो॒ नमो॑वृ॒न जग्मुः॑ ॥

न॒हि स्थू॒यर् ऋ॑तुथा या॒तम् अ॒स्ति नो॒त श्रवो॑ विविदे
सृ॒लत॑ग॒मेषु॑ ।

ग॒व्यन्त॑ इन्द्रं॒ स॒ख्याय॑ वि॒प्रा अ॒श्वाय॑न्तो वृष॑णं
वा॒जय॑न्तः ॥

यु॒वं सुरा॑मम् अ॒श्विना॑ नमु॒चाव् आसुरे॑ सचा॑ ।

वि॒पिपा॑ना शु॒भस् पती॑ इन्द्रं॒ कर्म॑स्व॒ आवत॑म् ॥

पु॒त्रम् इ॒व पि॒तरा॑व् अ॒श्विनो॑भेन्द्रा॒वथुः॑ काव्यै॑र्

दुंसनाभिः ।

यत् सुरामं व्य् अपिबः शर्चीभिः सरस्वती त्वा मघवन्
अभिष्णक् ॥

इन्द्रः सुत्रामा स्ववाअवोभिः सुमृळीको भवतु
विश्ववैदाः ।

बाधतां द्वेषो अभयं कृणोतु सुवीर्यस्य पतयः स्याम ॥
तस्य वयं सुमतौ यज्ञियस्यापि भद्रे सौमनसे स्याम ।
स सुत्रामा स्ववाइन्द्रो अस्मे आराच् चिद् द्वेषः सनुतर्
युयोतु ॥

10.131.01 Victorious Indra, drive off all our
foes, those who dwell in the east, and those
who dwell in the west, (drive) off, O hero, those
who dwell in the north, and those who dwell in
the south, that we may rejoice in your
exceeding felicity.

10.131.02 As the growers of barley often cut
the barley, separating it in due order, so do you,
(O Indra), bestow here and there nourishment
upon those who have not neglected the
performance of the sacrifice. [Barley: i.e.,
grain; cf. Yajus. 10.32; anupu_rvam viyu_ya: a
metaphor that god should pick out his diligent
worshippers one after the other, and bestow
blessing on them in due order].

10.131.03 The cart has not arrived in due
season, nor does he acquire fame in battles, (let
us), the sages, desiring cattle, desiring horses,
desiring food, (solicit) Indra, the showerer, for
his friendship.

10.131.04 You, O As'vins, lords of light, having
drunk the grateful (libation), jointly preserved
Indra in battle against the Asura Namuci.
[Yajus. 10.33].

10.131.05 Both the As'vins defended (you),
Indra, like two fathers (defending) a son with
glorious exploits; when (triumphing) through
the deeds of valour, you drank the grateful
libation, Sarasvati_ approached you, O
Maghavat. [Yajus. 10.34].

Alternative trans. of r.cas 10.31.4 and 5
(Hillebrandt, opcit. p. 321): When you, O lords
of light, had drunk (the draught) prepared with
Sura_ at Asura Namuci, you helped Indra with
your deeds. As parents help the son, so did you,
O As'vins, both help Indra with your wisdom
and marvellous powers. When you drank
skilfully (the draught) prepared with Sura_, O
bountiful one, Sarasvati_ healed you.

10.131.06 May Indra, the protector, the
possessor of great wealth, the all-knowing, be
favourable (to us) with his protections; may he
confound our enemies, may he make us free
from fear, may we be the parents of excellent
male offspring.

10.131.07 May we be ever in (the enjoyment
of) the favour of that adorable divinity
(retained) in his favourable thoughts, and may
the protecting and opulent Indra drive away far
off us those who hate us.

अपाम् फेनेन नमुचेः शिर इन्द्रोद् अवर्तयः ।

विश्वा यद् अज्यं स्पृधः ॥

8.014.13 You have struck off, Indra, the head of
Namuci with the foam of the waters, when you
had subdued all your enemies. [Namuci: legend
from s'alya parvan, Maha_bha_rata: Indra after
defeating the asuras was captured by Namuci.
Namuci however, liberated him on the
condition that he would not kill him with any
weapon, dry or wet, nor by day or night. In
evasion of his oath, Indra at twilight, or in a
fog, decapitated Namuci with the foam of
water; cf. Taittiri_ya Sam.hita_ 1.8.7].

वि षू मृधौ जनुषा दानम् इन्वन् अहन् गवा मघवन्
सृततचकानः ।

अत्रा दासस्य नमुचेः शिरो यद् अवर्तयो मनवे गातुम्

इच्छन् ॥

युजं हि माम् अकृथा आद् इद् इन्द्र शिरो दासस्य

नमुचेर् मथायन् ।

अश्मानं चित् स्वर्यं वर्तमानम् प्र चक्रियेव रोदसी

मरुद्भयः ॥

5.030.07 Maghavan, who are glorified by us, assailing with the thunderbolt the antagonist (of the gods), you have slain those who were ever hostile (to you) from your birth; desiring to do good to Manu, you have bruised the head of the slave Namuci. [Desiring to do good to Manu: manave ga_tum icchan: ga_tum = sukham; identifying Manu with the r.s.i of the su_kta, Namucina apa_hr.tagodhana_ya mahyam, to me whose wealth of cattle has been carried off by Namuci, an asura].
 5.030.08 Verily you have made me, Indra, your associate when grinding the head of the slave Namuci like a sounding and rolling cloud; and the heaven and earth (have been caused) by the Maruts (to revolve like a wheel). [Like a sounding and rolling cloud: as'ma_nam cit svaryam vartama_nam: the first two are rendered megham iva, like a cloud].

प्र श्येनो न मदिरम् अंशुम् अस्मै शिरो दासस्य

नमुचेर मथायन् ।

प्रावन् नमी साप्यं ससन्तम् पुणग् राया सम् इषा सं
 स्वस्ति ॥

6.020.06 And the hawk bore to Indra the exhilarating Soma, when, bruising the head of the oppressor Namuci, and protecting the slumbering Nami, the son of Sapyā, he provided, for the well-being (of the sage), riches and food.

Alloy of gold and silver

In the Babylonian Talmud (+2nd century), asemon is a commonly used word referring to bullion (gold, silver or mixed). Leiden X papyrus (ca. +3rd century) says: "no.8. It will be asem, (i.e. electrum, an alloy of gold and silver) which will deceive even the artisans (a tin-copper-gold-silver alloy); no.12. Falsification of gold (a zinc-copper-lead-gold alloy)..." (Needham, Joseph, 1971, *Science and Civilization in China*, Vol. 5, Part II, pp. 18-21). Asem denoted the natural alloy of silver and gold; it also meant any bright metal made with copper, tin, lead, zinc, arsenic and mercury. Twelve or thirteen different alloys

were called asem. (ibid., p. 45). 'The existence of this alloy (assem) may have been the original cause for the suggestion of transmutation since by adding silver to it, one would get a metal nearly identical with the crude silver from the mine; and by adding gold, something indistinguishable from gold. [The paucity of the Egyptian language may perhaps have been responsible for a confusion. Gold was the 'yellow metal', and the alloy produced was also a 'yellow metal'.] (Hopkins, A.J., 1967, *Alchemy*, pp. 103-4).

Gypsy. **sovnakay, somnakay** = gold [cf. suvarṇa 'gold' (Skt.)]; Dardic **son,surun** = gold. **samr.obica**, stones containing gold (Mundari.lex.) cf. **soma** (R.gveda) **samanom** = an obsolete name for gold (Santali). **saman:** = to offer an offering, to place in front of; front, to front or face (Santali)

In Arthas'astra, **s'ulva** means (1) copper (2.13.16 and 44; 2.14.20-22 and 30-31); and (2) underground vein of metal ore (2.12.1) or water (2.24.1). s'ulva-su-tra may, therefore, connote a veiled term for transmuting 'copper ore'.

s'ulva = copper (Skt.); **s'ulba su-tras** are relatable to the Rules to process copper and other metals (often explained as the geometry of fire-altars). Arthas'astra that the a_kara-adhyaks.a (director of mines) should be versed in the sciences of s'ulba, dha_tu,rasa-pa_ka (sciences of copper/minerals, metals and technology of smelting of ore). cf. S'atapatha Bra_hman.a (10.6.2.5-7): 'Well,when they perform with the hearth-spit (spit-bath -- s'ulvabhr.ta), that is his purificatory bath'.

soma man.al = vel.l.i man.al, sand containing silver ore (OTa.) ma_raka ve_tai = killing of metals (Ta.) vedhana (Skt.) ve_tai, ve_ta iyal = alchemy, rasa va_da; taricana ve_ti = a root capable of achieving transmutation (Ta.) vedi = fire altar (Skt.)

kaks.i_va_n dairghatamasa (aus'ija) or the bee taught As'vini_kuma_ra the mystic science

ma_ks.ika_ (copper pyrites), vimala (a pyrite), s'ila (rocks), capala (?sulphur-mineral), rasaka (calamine), sas'yaka (blue vitriol), darada (cinnabar) and sroton~jana (stibnite) -- these are the eight maha_-rasas. (*Rasa_m.ava* 7.2-3).

उत स्या वाम् मधुमन् मक्षिकारपन् मदे सोमस्यौशिजो
हुवन्यति ।

युवं दधीचो मन आ विवास्यथो ऽथा शिरः प्रति वाम्
अश्व्यं वदत् ॥

1.119.09 That honey-seeking bee also murmured your praise; the son of us'ij invokes you to the exhilaration of Soma; you conciliated the mind of Dadhyan~c, so that, provided with the head of a horse, he taught you (the mystic science).

**uta sya_ va_m madhuman ma_ks.ika_rapan
madey somasyausijo huvanyati**

RV 1.119.9 To you, O As'vins, that 'fly' betrayed the Soma. [Note the pun on the word, ma_ks.ika_ meaning both 'bee' and 'pyrites or quartz'.

RV 1.80.16: Atharvan, Manus.pitr. and Dadhyan~c spread the dhi_. In RV 1.84.14 the head of Dadhyan~c is referred to: icchann as'vasya yac chirah parvates.v a_pas'ritamtad vidac charyan.a_vati, 'he looked for the head of the horse which was hidden in the mountains and found it in s'aryan.a_vat (lake).' TMBr. 12.8.6 calls Dadhyan~c an A_n:gi_rasa. The thunderbolt is fashioned from the bones of Dadhi_ci. (cf. MBh. 3.100: the hermitage of the R.s.i Dadhi_ca is located on the banks of the Sarasvati_.

ma_ks.ika_ are pyrites; hema ma_ks.ika_ and ta_ra ma_ks.ika_ denote gold and silver pyrites. *Rasaratna Samuccaya* 77,81, 89-90: ma_ks.ikam is born of mountains yielding gold...and is produced in the bed of the river Tapi and in the lands of the Kira_tas, the Chinese and the Yavanas... Ma_ks.ika_

repeatedly steeped in honey, oil of the seeds of *ricinus communis*, urine of the cow, clarified butter and the extract of the bulbous root of *musa sapientum* and gently roasted in a crucible, yields an essence of copper. (cf. *Rasa_m.ava* 7.12-13 and Na_ga_rjuna's *Rasaratna_kara* 25-30 containing the same formula). The reference to cow's urine may explain ma_nus.i_r a_pah (piss on it) in RV 9.63.7, 'putting into movement the human waters'.

We will trace the intimations of working with electrum, while elaborating the processing of Soma in the R.gveda.



Tiamat.
British
Museum.

http://www.mesopotamia.co.uk/gods/explore/exp_set.html

In the Babylonian Epic of Creation, Tiamat is an angry goddess, who decides to destroy the other gods. She creates a vast army of demons. The other gods decide that Tiamat should be killed, but they are all afraid. Marduk agrees to kill Tiamat if he is made supreme god. Marduk kills Tiamat and, to make heaven and earth, cuts her body in half. From her eyes flow the rivers Tigris and Euphrates.



Just as there is evidence of substrate language in Sumer, there is evidence for Sumerian element in the Atharvaveda. It relates to Tia_mat which is cognate with AV Taima_ta mentioned as a charm against snake-poison:

AV V.13.6

**asitasya taima_tasya babrorapodakasya ca
Sa_tra_sa_hasya_ham manyorava jya_niva
dhanvano vi mun~ca_mi rathau iva**

6. I release (thee) from the fury of the black serpent, the taimâta, the brown serpent, the poison that is not fluid, the all-conquering, as the bowstring (is loosened) from the bow, as chariots (from horses).

Tia_mat is an Assyrian word and refers to a personified abyss and a female, mythical sea-monster. The word also occurs the Greek work of Damascius (6th cent. CE) and in Assyrian 'creation' tablets. This is based on a Babylonian belief in a female genetrix from which all things, even gods themselves, were generated. Tia_mat is a being of the sea, a dragon with the head of a tiger or griffin, with wings, four feet claws, and scaly tail. Husband of Tia_mat is Kingu or Abzu (meaning primeval chaos or watery abyss). When Tia_mat was vanquished by Marduk, her two parts became heaven and earth; the skin became constellation of dragon.

This picture of Tia_mat may be represented on a pot found in Baluchistan.

"The Avestan religion was founded in Eastern Iran and its institution is connected with the name of Zarathustraⁱⁱ. Every founder of religion works with the aid of materials acquired from history. Zarathustra ground his work upon the old Arian Religion of Nature which the Iranian nation shared with the Indian people. Upon the fact of common foundation are based all analogies between the Zoroastrian and the Brahmanical religion. It is certain that Zarathustra conscious of its tendencies altered the existing materials. The form and the tenor of the old religion were altered alike to such an extent indeed that scarcely anything has survived from the ancient faith except some names and certain primitive ideas. The last remnants of the symbolical conceptions of nature have been scanty enough preserved in certain Yazatas like Mithra Sraush Anahita. But the character and the essential portion of religion that in fact which gives it, its true nature, is entirely a new creation." (Geiger

Civilization of the Eastern Iranians in Ancient Times, p. xxiv).

Four classes are mentioned in Avesta: athravan (priest), rathaeshtar (warrior), vastriosha (cultivator) and hutaoksha (workman). [Ga_tha_ Ha. 48.5; Yasna Ha 19.17).

Vedic duels between Indra-Vr.tra are paralleled in Tishtar-Apaosha. Tishtar is an angel who presides over the rains; Apaosha is a demon who stopped the rains. Indra as Verethraghna (Vr.traghna) is an angel called Beheram Yazata; while, Indra as Indar is a demon.

VS XVII.32 notes that Vis'vakarman was created first and then he did the work of creation. Bundehishna notes that Ahuramazda created Vohuman, an archangel who continued the further work of creation. Universe is an egg (Manu. I.5,ff.); also in Avestan (Minokhred 44.8 – a Pahlavi text). RV X.190 described the order of creation: moral law (r.ta in RV, asha in Avestan) followed by the sun, the earth and the wky. So too in Ga_tha_ (Yasna 44.315).

Vedic br.hat sadanam (heaven) parallels Avestan hadhana. (RV IX.113; X.17; 27; X.14.11; Yasna 11.10; 62.6; Dadestan 26.2).

Vedic As'vin-s are Avestan As'pina_. (RV VII.67.10: as'vinau yuva_nau) becomes Avestan as'pina_ yevino. Sarasvati_ is Harakhaiti; Apa_m Napa_t is the same; Trita is Thritha; Vala is Vara; Us.as is Ushangha or Usha (Ushahain Gaha 5); Aramati_ is A_ramaiti; Aryaman is Airyaman; Bhaga is Bagha; Amr.tas are Ameshspentas; pitr.s (RV VI.75.9: sva_durvasadah pitaro vayodha_h kr.cchres'ritah s'akti_vanto gabhi_ra_h) are farohars; yajatras are yazatas; na_bha_nedis.t.ha is nabanazdishta; ks.atra is khshathra.

Dya_va_pr.thivi_ the dual are adored together; so are Asman and Zem (Fra. Yt. 17,23,24,30,37,45,69,71,75); vis'vedeva_h (AV XI.6.19) are Avestan Vispe Yazata (Yasna

1.19; 2.18; Yt. 11.17.17.19); vis'vedeva_h are 32 (RV VII.39.9; AV X.7.10); Vispe Yazata are 32 (Mithra Yt. 61). Evil spirits: Vedic dr.ha is Avestan druj; Vedic ra_ks.asa are Avestan Rakhsa (Yasna 24.12, an evil being); Ya_tu are evil beings in both Vedic and Avestan.

Vedic svar, light of heaven (RV X.68.9) is Avestan hvar (sun); both have comparable epithets: amr.ta-amesh, raya (shining); advartaspa (possessing swift horses). [Khurshed: hvare khshaetem ameshem rayem advart aspem yazamahade].

Varun.a is an asura and the lord of r.ta (mortal realm); Ahuramazda is the lord of Asha (eternal law) (Yasna Ha 44.5; 6,12,19: 46.6). Varun.a prepared a path for the sun (RV I.24: varun.ascaka_ra su_rya_ya pantha_m); so in Yasna 44.3: kheng staremehs dat advanem. Varun.a is sukratu; Ahuramazda is khratuma; Varun.a and Ahuramazda are maha_n; vis'vavedah-vispavidva_o, suda_nu-hudhanu, amr.tarevah-ameshaspenda, revat (dadha_te)-raevat, arabdha-adhavish, sumr.l.ika-merajdika, uruchaks.us-vouruchashane, bhes.aja-baishajya (RV VIII.42.1; Vend.19.20; RV 67.4; Ahurayasht 14; RV I.136.6; Ahura Yasna 51.4; RV I.25.5; Gatha Yasna 33.13; VS XXXVIII.34; Yasht7). One of the 101 names of Ahuramazda is Varun.a. Gna_h are wives of Varun.a (RV I.62.8; VIII.28); Genao are the wives of Ahuramazda (Yasna 38.1-2; Gna_h rr Genao are the waters of rain). Ahuramazda's son was Atar, fire (ahurahe mazdao putha); agni was born of the womb of asura (RV III.29.1).

Both Mitra and Mithra are friends of man and use spies to watch men (spas'a-spas); they are priests (hotar-zaotar); both live in thousand-pillared palaces (sahasrasthu_n.a-hazangrastuna).

In RV VII.1.1 Agni is called atharyu; this is Avestan athravan. Avesta refers to Vedic Agni as Agenya_o – an adjective (Yasna 38.5). Barhis or barsam was spread on the fire-altar (Sraosha Yt. Ha 57.6). Description of Agni:

ojasvat-aozonghvat, gr.hapati-vis'vatinmanopaiti, sakha_hakha (RV II.36.5; Atashnyaish; RV I.12.2,6; VII.15.2; Yasna 17.11). A_tar is connected with Nairyasangha (Vendidad 19.14); this parallels Vedic Na_ra_s'am.sa.

Vedic Agnigr.ha is Avestan Agnyaga_ra-Agya_ri.

The priest who installed the holy fire was Kair Ushan (later called Kai Kaus, grandfather of Kai Khusru). RV VIII.23.17 (us'ana_ka_vyastva_ni hota_ramasa_dayat) also refers to the same act by Kavi Us'ana.

Instructions contained in Gautama Dharmasu_tra (IX.32) or Vis.n.u-Smr.ti (71.32) to preserve the purity of the fire were also applied by Zoroastrians. (Vendidad 18.1).

Four types of fire (AV III.21.1) – jat.hara_gni, aus.adha_gni, as'ma_gni, vaiduta_ni – are Avestan vohufrayan, urvazishta, berezisavangh, vazishta.

There are many concordances between Vedic and Avestan and almost all point to Vedic > Avestan chronology on the grounds of both linguistics and semantics:

Vivanghavat (Vivasvat, father of Yama: RV VI.4.8), the father of Yima-Jamshed is said to have performed the first Soma-yasna (RV IX.26.4 Vivasvat produced Soma). Soma is called zairi (hari). Soma is called a_turasya bhes.ajam (RV VIII.72.17; and haoma dazdi me beshajanama (Yasna 10.9); other comparative cognates are: sukratu-hukhratu; svarsa-hvares; vr.traha_verethraja; saumyam madhu-haomahe madho). Soma is brought from Mujavat by a Syena (RV I.89.3); Avestan Haoma Yasht notes that it was brought from the mount Alburz by birds. (Haoma Yasht II.10).

In RV IX.34.4 Trita A_ptya prepared Soma. In Avestan, A_thvya second son of Vivanghavat and Thritha was the third son. Thritha was a

divine physician. So was Trita. (RV VIII.47.13,14).

अस्य त्रितः क्रतुना वव्रे अन्तर इच्छन् धीतिम् पितुर्
एवैः परस्य ।

सचस्यमानः पित्रोर् उपस्थे जामि ब्रुवाण आयुधानि
वेति ॥ स पित्र्याण्य् आयुधानि विद्वान् इन्द्रैषित
आस्यो अभ्य् अयुध्यत् ।

त्रिशीर्षाणं सप्तर्षिं जघन्वान् त्वाष्ट्रस्य चिन् निः
संसृजे त्रितो गाः ॥

(Tris'ira_ Tvas.t.ra) RV 10.008.07 Trita by (his own), desiring a share (of the sacrifice), for the sake of taking part in the exploit of the supreme protector (of the world), chose (Indra as his friend); attended (by the priests) in the proximity of the parental heaven and earth, and reciting appropriate praise, he takes up his weapons. [Legend: Indra said to Trita, 'You are skilled in the weapons of all; aid me in killing Tris'iras the son of Tvas.t.a_'. Trita agreed on condition of having a share in the sacrifices offered to Indra. Indra gave him water to wash his hands with and a share in the sacrifice, whereby Trita's strength increased; seven-rayed: i.e., seven-tongued, seven-rayed, like the sun, or seven-handed].

RV 10.008.08 He, the son of the waters, incited by Indra, skilled in his paternal weapons, fought against (the enemy), and slew the seven-rayed, three-headed (asura); then Trita set free the cows of the son of Tvas.t.a_.

अहम् भुवं वसुनः पूर्व्यस् पतिर् अहं धनानि सं जयामि
शश्वतः ।

मां हवन्ते पितरं न जन्तवो ऽहं दाशुषे वि भजामि भ
र्जनम् ॥

(Indra Vaikun.t.ha) RV 10.048.02 I, Indra, am the striker off of the head of the son of Atharvan, I generated the waters from above

the cloud for the sake of Trita. I carried off their wealth from the Dasyus; taming the clouds for Dadhyan~c, the son of Ma_taris'van. [Son of Atharvan: named Dadhyan~c: S'atapatha Bra_hman.a 14.5.16; RV 1.116.12; Trita = Tria A_ptya, who had fallen into a well; RV 10.33.2; Dadhyan~c, son of Ma_taris'van: different from another Dadhyan~c the son of Atharvan; ma_taris'vanah putrah: S'atapatha Bra_hman.a 14.2.5.16].

These hymns note how Trita A_ptya skilled in the use of his father's weapons killed the three-headed demon with a metal-pointed shaft and freed the cows. (RV X.48.2). This paralleled by Avestan Thraetaona Athvya who killed the three-headed and six-eyed Azi Dahaka who was a Druj who caused a great calamity in the world. (Gosha Yt. 13.14; Aban Yt. 33-34; Vendidad 19.113).

"The Avesta kows the beginning or source of the Aryans as Airyana Vaejo (Pahlavi Iran-Vej). The Avestan Vaejo corresponds to the Sanskrit bi_j meaning 'beginning or source'. The Avesta describes it as a place of extreme cold that became over-crowded (Vend. I. 3-4; II. 8-18). ... Whether the Mitannian kings (1475-1280 B.C.) on the upper Euphrates were a direct offshoot of the Aryans or not there names are certainly Aryan, for example Saussatar, Artatama, Sutarna, Tusratta and Mattiuaza (H. Oldenburg: in *Journal of the Royal Asiatic Society*, 1909, p. 1094-1109)... Mattiuaza, in his treaty with the Hittite king Aubbiluliuma signed in 1380 B.C. at Boghazkoy, invokes not only Babylonian gods to witness the treaties, but Mitra, Varun.a, Indra, and Na_satya in the form in which they appear in the Rigveda (S. Konow: Aryan gods of the Mitani people, 1921, pp. 4-5). They occur in the treaty as ila_ni Mi-it-ra-as-si-il ila_ni A-ru-na-as-si-il In-da-ra ila_ni Na-sa-at-ti-ya-an-na. Since the form for Na_satya is quite different in the Avestan language (Naonhaithya) it is argued that the Mitannian did not speak Iranian but Indo-Aryan (E.Meyer: Sitzungsberichte der K. Preuss. Akad. der Wissen, 1908, I, p. 14f.)... The name for 'fire' in the Persian Avesta is quite different, being atar, and this does not occur in the Indian Veda except in the Vedic proper name Atharvan, which

corresponds to the Avestan name of the fire priest. Agni, as a messenger between gods and man, was known to the Vedas as Nara_-s'amsa. This corresponds with the Avestan messenger of Ahura, Nairyo_-sangha.” (R.A. Jairazbhoy, 1995, *Foreign Influence in Ancient Indo-Pakistan*, Karachi, Sind Book House). [Note the use of the word san:ga in the Sumerian substrate language to connote a priest. san:ghvi_ (G.) means a priest leading the pilgrims.]

Other parallels are in ceremonies: sautra_man.i-stoma, ba_ja and pravargya-paragaru. (RV I.5.8: tva_m stoma_ avi_vr.dhan tva_muktha_s'atakrato sanodimam va_jamindrah sahasrin.am). Vedic a_pri_ hymns are paralleled by Avestan Afringan recitals. The Ga_hanaba_r of ancient Iran are paralleled by the ca_turma_sya is.t.ayah of Bha_rata and both are seasonal ceremonies. AB IV.24,25; I.3 note the nine principal days of dva_das'a_ha yajn~a; this is paralleled by the baresnum (purification) ceremony of nine nights (Vendidad Chap. 9).

AV 2.405.3 ‘cough, fly forth along the flood of the sea’

AV 2.4010.4 ‘the heavens, born in the sea, brought on from the river’

AV 7.6142.2 ‘be inexhaustible as the sea’

AV 7.6106.2 ‘the dwelling-place of the sea. In the midst of a pond’

AV 10.11005.3 ‘the earth upon which the sea, and the rivers ‘

AV 11.2.25 25. The dolphins, great serpents (boas), purīkayas (water-animals), sea-monsters, fishes, ragasas at which thou shootest-there exists

for thee, O Bhava, no distance, and no barrier. At a glance thou lookest around the entire earth; from the eastern thou slayest in the northern ocean.

AV III, 15. A merchant's prayer.

1. Indra, the merchant, do I summon: may he come to us, may he be our van; driving away the demon of grudge, the waylayers, and wild

beasts, may he, the possessor, bestow wealth upon me!

2. May the many paths, the roads of the gods, which come together between heaven and earth, c,ladden me with milk and ghee, so that I may gather in wealth from my purchases!

3. Desirous do I, O Agni, with firewood and ghee offer oblations (to thee), for success and strength; according to ability praising (thee) with my prayer, do I sing this divine song, that I may gain a hundredfold!

4. (Pardon, O Agni, this sin of ours [incurred upon] the far road which we have travelled!) May our purchases and our sales be successful for us; may what I get in barter render me a gainer! May ye two (Indra and Agni) in accord take pleasure in this oblation! May our transactions and the accruing gain be auspicious to us!

5. The wealth with which I go to purchase, desiring, ye gods, to gain wealth through wealth, may that grow more, not less! Drive away, O Agni, in return for the oblation, the gods who shut off gain!

6. The wealth with which I go to purchase, desiring, ye gods, to gain wealth through wealth, may Indra, Pragâpati, Savitar, Soma, Agni, place lustre into it for me!

7. We praise with reverence thee, O priest (Agni) Vais'va_nara. Do thou over our children, selves, cattle, and life's breath watch!

8. Daily, never failing, shall we bring (oblations to thee), O Jâtavedas, (as if fodder) to a horse standing (in the stable). In growth of wealth and nutriment rejoicing, may we, O Agni, thy neighbours, not take harm!

AV III.5.6,7 karma_ra, rathaka_ra, dhiva_na (wheelright)

6. The skilful builders of chariots, and the ingenious workers of metal, the folk about me all, do thou, O parna, make my aids!

7. The kings who (themselves) make kings, the charioteers, and leaders of hosts, the folk about me all, do thou, O parna, make my aids!

AV VIII.2.17

17. When thou, the barber, shearest with thy sharp well-whetted razor our hair and beard, do not, while cleansing our face, rob us of our life!

AV IV.5.5 harmya

5. Of him that sits, and him that walks, of him that stands and looks about, of these the eyes we do shut, just as these premises (are shut).

AV VIII.1.6 chariot-riding

6. Thou shalt ascend and not descend, O man! Life and alertness do I prepare for thee. Mount, forsooth, this imperishable, pleasant car; then in old age thou shalt hold converse with thy family!

AV III, 4. Prayer at the election of a king.

This is an echo of the description in R.gveda su_kta RV 10.173 addressed to the ra_ja_ describing the role of the vis'a in choosing a king. Authority came from the people – king-makers, charioteers, workers of metal.

आ त्वाहार्षम् अन्तर् एधि ध्रुवस् तिष्ठाविचाचलिः ।

विशस् त्वा सर्वा वाञ्छन्तु मा त्वद् राष्ट्रम् अधि
भ्रशत् ॥

RV 10.173.01 I have consecrated you, (Rasa); come among us, be steady and unvacillating, may all your subjects desire you (for their king), may the kingdom never fall from you. [A play on the words: rasa and ra_ja_, as the devata_].

The election occurs with electors assembled in the Samiti (dhruva_ya te samitih kalpata_miha: AV VI.88.3). People of all the lands used to assemble in the Samiti (AV XII.1.56: sam. gra_ma = villages together: ye samgra_ma samitayah). Samiti was a meeting place, a national assembly of all the people (vis'ah). Vis'ah had the right to elect or re-elect the king (AV VI.87.1; RV 10.173.1). AV III.4.2 notes: tva_m vis'o vr.n.uta_m ra_jya_ya. The verse AV III.4.7 notes that the election has to be unanimous. 'To whomsoever the chiefs agree to entrust the kingdom he becomes the chief and not he over whom they do not agree' (**yasmai va ra_ja_no ra_jyam anumanyante sa ra_ja_bhavati na sa yasmai na** : Ait. Br. 9.3.4.5; 9.4.1.1 and 13; 9. 4.3.12). S'Br. 13.2.1.1-2 also notes that the bra_hman.a be born in the Brahman (priestly order) to be endowed with spiritual luster (brahmavarcas), and the ra_janya be born in royal order (ra_s.t.ra) to be heroic, skilled in archery, sure of his mark and a mighty car-fighter. Ait. Br. 8.12-17 indicates that the state was a result of the exigencies of war.

1. (Thy) kingdom hath come to thee: arise, endowed with lustre! Go forth as the lord of the people, rule (shine) thou, a universal ruler! All the regions of the compass shall call thee, O king; attended and revered be thou here!

2. Thee the clans, thee these regions, goddesses five, shall choose for empire! Root thyself upon the height, the pinnacle of royalty: then do thou, mighty, distribute goods among us!

3. Thy kinsmen with calls shall come to thee; agile Agni shall go with them as messenger! Thy wives, thy sons shall be devoted to thee; being a mighty (ruler) thou shalt behold rich tribute!

4. The Asvins first, Mitra and Varuna both, all the gods, and the Maruts, shall call thee! Then fix thy mind upon the bestowal of

wealth, then do thou, mighty, distribute wealth among us!

5. Hither hasten forth from the farthest distance heaven and earth, both, shall be propitious to thee! Thus did this king Varuna (as if, 'the chooser') decree that; he himself did call thee: 'come thou hither'!

6. O Indra, Indra, come thou to the tribes of men, for thou hast agreed, concordant with the Varunas (as if, 'the electors'), He did call thee to thy own domain (thinking): 'let him revere the gods, and manage, too, the people'!

7. The rich divinities of the roads, of manifold diverse forms, all coming together have given thee a broad domain. They shall all concordantly call thee; rule here, a mighty, benevolent (king), to up the tenth decade (of thy life)!

The king-makers (ra_jakr.tah) include: chariot-builders, workers of metals, charioteers, the leaders of village (AV III.5.6-7).

Bhr.gu-s were wagon- or chariot-builders:

एवेद् इन्द्राय वृषभाय वृष्णे ब्रह्माकर्म भृगवो न रथम् ।
नू चिद् यथा नः सख्या वियोषद् असन् न उग्रो ऽविता
तनूपाः ॥

(Va_madeva Gautama) RV 4.016.20 Therefore we offer to the vigorous Indra, the showerer (of benefits), holy adoration, that he may never withdraw his friendly (actions) from us, and that he may be our powerful protector, the defender of (our) persons, as the Bhr.gus (fabricate) a car (for use). [Bhr.gavo na ratham: bhr.gavo = di_ptas taks.a_n.ah, bright or dexterous carpenters; i.e. as a wheelwright makes a chariot for a special purpose, so the worshipper performs worship in order to secure Indra's favour].

एतं वां स्तोमम् अश्विनाव् अकर्मतक्षाम भृगवो न
रथम् ।

न्य् अमृक्षाम योषणां न मर्ये नित्यं न सूनं तनयं
दधानाः ॥

(Ghos.a_ Ka_ks.i_vati_) RV 10.039.14 For you, As'vins, we have made, we have built this praise, as the Bhr.gus (built) your car; cherishing this praise like a son, the eternal performer of rites, we have decked (with ornaments, your laudation) among men, as if had been a wife.

Sabha_ or Naris.t.a_ was a sub-assembly of the Samiti. Sabha_ is called Naris.t.a_ (ca_ru vada_ni pitarah san: gates.u), i.e. 'dear to the people', 'that which cannot be broken' (according to Sa_yan.a). AV X.8.24: a_nanda_ moda_h pramudorma_moda mudas'va ye haso naris.t.a_ nr.tya_ni s'ari_ramanupra_vis'an). Sabha_ was the place where people met in a social gathering. (RV VI.28.6); it is also a place for gambling (AV XII.3.46). Zimmer analyses that the sabha was the assembly of the village which served social and political functions while the samiti the chief assembly met in the capital and deliberated and acted on matters of interest to the entire state. (AV 7.12.1 and 15.9 may indicate that the two institutions had different functions).

यूयं गावो मेदयथा कृशं चिद् अश्रीरं चित् कृणुथा
सुप्रतीकम् ।

भद्रं गृहं कृणुथ भद्रवाचो बृहद् वो वयं उच्यते
सुभासु ॥

RV 6.028.06 Do you, cows, give us nourishment; render the emaciated, the unlovely body the reverse; do you, whose lowing is auspicious, make my dwelling prosperous; great is the abundance that is attributed to you in religious assemblies. [br.had vo vaya ucyate sabha_su, great of you the food is said in assemblies; or, great is the food given to you in assemblies, it is given by all, sarvair di_yate ityarthah].

“In the Epic we find the sabha_ (compare German sippe) to be an assembly of any sort. It may be a judicial one, a court of law; it may be a royal one, the king’s court; it may be a social gathering for pleasure; and finally it may, in its older meaning, be a political assembly...samiti having now become a meeting of the nobles and king.” [Edward W. Hopkins, 1889, *The social and military position of the ruling caste in ancient India as represented by the Sanskrit epic*, repr. 1972, Varanasi, Bharat-Bharati, p. 92.]

AV VII, 12. Charm to procure influence in the assembly

1. May assembly and meeting, the two daughters of Pragâpati, concurrently aid me! May he with whom I shall meet co-operate with me, may I, O ye Fathers, speak agreeably to those assembled!

2. We know thy name, O assembly: 'mirth,' verily, is thy name; may all those that sit assembled in thee utter speech in harmony with me!

3. Of them that are sitting together I take to myself the power and the understanding: in this entire vathering render, O Indra, me successful!

4. If your mind has wandered to a distance, or has been enchained here or there, then do we turn it hither: may your mind take delight in me!

Vidatha

Another institution is vidatha (AV I.13.4). RV also refers to it (RV 1.167.3; 10.85.26; AV 14.1.21; 13.3.24); The members of vidatha probably included women; it was an egalitarian and communal institution comparable to the later Buddhist sangha; it also served as a war council and a religious body:

मिम्यक्षु येषु सुधिता घृताची हिरण्यनिर्णिग् उपरा न ऋष्टिः ।

गुहा चरन्ती मनुषो न योषा सभावती विदुष्येव सं वाक् ॥

(agastya maitra_varun.i) RV 1.167.03 In whom the water-shedding, golden-coloured lighting, is fitly deposited like a chaplet (of clouds) moving in the firmament like the (splendidly-attired) wife of a man (of rank), and distinguished in assemblies like a sacrificial hymn. [guha_caranti manus.o na yos.a_, going in the darkness of the sky, as if it was in private or in secret, like the wife of a man, who, although, is brilliantly attired, remains in the privacy of the female apartments, suves.a_ntahpura eva madhye carati; distinguished in assemblies: sabha_vati vidatheva sam. va_k; the first is referred to the lightning, which, at times, shows itself as if in an assembly, sabha_; the reference may also be to yos.a_, a woman who is not always restricted to the private chambers, but appears occasionally in public].

पूषा त्वेतो नयतु हस्तगृह्याश्विना त्वा प्र वहतां रथेन ।

गृहान् गच्छ गृहपती यथासौ वशिनी त्वं विदुष्यम् आ वदासि ॥

(su_rya_sa_vitri_ (r.s.ika_)RV 10.085.26 May Pu_s.an lead you hence, taking you by the hand; may the As'vins convey you away in their car, go to the dwelling (of your husband) as you are the mistress of the house; you, submissive (to your husband), give orders to his household.

वहिं यशसं विदुष्यस्य केतुं सुप्राव्यं दूतं सद्योर्थम् ।

द्विजन्मानं रयिम् इव प्रशस्तं रातिम् भरद् भृगवे मातरिश्वा ॥

1.060.01 Ma_taris'van brought, as a friend, to Bhr.gu, the celebrated Vahni, the illuminator of sacrifices, the careful protector (of his votaries), the swift-moving messenger (of the gods), the

offspring of two parents, (to be to him) as it were a precious treasure. [ra_tim bhr.gun.a_m, son of the Bhr.gu; or, the wind brought Agni to the sage Bhr.gu, as a friend (ra_ti); cf. ara_ti = enemy, one who is not a friend. Offspring of two parents: eigher of heaven and earth, or of the two pieces of wood].

असूत पूर्वो वृषभो ज्यायान् इमा अस्य शुरुयः सन्ति
पूर्वीः ।

दिवो नपाता विदथस्य धीभिः क्षत्रं राजाना प्रदिवो
दधाथे ॥

3.038.05 The showerer (of benefits), the preceder and elder (of the gods), generated (the waters); they are the abundant allayers of his thirst; sovereign Indra and Varun.a, grandsons of heaven, you possess the wealth (that is to be acquired) by the rites of the splendid sacrifice.

This r.ca seems to indicate that the term, vidatha was associated with civil, military and religious functions. It is possible that sabha_, samiti and sena_ were formed out of vidatha (AV XV.9.2). Sabha was 'a body of men shining together' and hence may have been composed of distinguished people advising the samiti or the king.

Sena_ (army)

अग्निर् इव मन्यो त्विषितः सहस्व सेनानीर् नः सहूरे
हूत एधि ।

हृत्वाय शत्रून् वि भजस्व वेदु ओजो मिमानो वि मृधो
नुदस्व ॥

RV X.84.2 10.084.02 Manyu, blazing like Agni, overthrow (our foes), come as our general, enduring (manyu) when invoked (by us) in battle; having slain the enemies divide (among us) the treasure; granting (us) strength, scatter (our) foes.

The warriors carried weapons: paras'u (AV XI.9.1), as'i (AV V.21.9), stringed bow with quivers and arrows (AV III.23.1) some of which had poisoned tips (AV V.18.15). They put on armour and held flags (AV IX.10.1: uttis.t.hata sam sahyadhvam uda_ra_h ketubhih saha). Some had surya or sun on their banners (AV V.21.2: suryaketavah). They used a drum (AV V.20) made of wood and covered with the skin of an antelope (AV V.21.7) and with the skin of cow (AV V.20.1; 21.3).

Rudra is armed with bows and arrows (AV I.18.1; VI.93.1; XV.5.1.7), a bolt and a club (AV I.28.5). Br.haspati has a bow and arrows (AV IV.18.9); he holds the bolt which he uses to kill the asura-s (AV XI.10.13).

AV III.1.1; 2.1 note3 that Agni is the leader of the vanguard of the armies.

AV VIII, 8. Battle-charm. The first verse adores Indra as the warlord who pierces the forts and armies of the enemy.

1. May Indra churn (the enemy), he, the churner, Sakra (mighty), the hero, that pierces the forts, so that we shall slay the armies of the enemies a thousandfold!

2. May the rotten rope, wafting itself against yonder army, turn it into a stench. When the enemies see from afar our smoke and fire, fear shall they lay into their hearts!

3. Tear asunder those (enemies), O asvattha (ficus religiosa), devour (khâda) them, O! khadira (acacia catechu) in lively style! Like the tâgadbhanga (ricinus communis) they shall be broken (bhagyantâm), may the vadhaka (a certain kind of tree) slay them with his weapons (vadhaih)!

4. May the knotty âhva-plant put knots upon yonder (enemies), may the vadhaka slay them with his weapons! Bound up in (our) great trap-net, they shall quickly be broken as an arrow-reed!

5. The atmosphere was the net, the great regions (of space) the (supporting) poles of the net: with these Sakra (mighty Indra) did surround and scatter the army of the Dasyus.
6. Great, forsooth, is the net of great Sakra, who is rich in steeds: with it infold thou all the enemies, so that not one of them shall be released!
7. Great is the net of thee, great Indra, hero, that art equal to a thousand, and hast hundredfold might. With that (net) Sakra slew a hundred, thousand, ten thousand, a hundred million foes, having surrounded them with (his) army.
8. This great world was the net of great Sakra: with this net of Indra I infold all those (enemies) yonder in darkness,
9. With great dejection, failure, and irrefragable misfortune; with fatigue, lassitude, and confusion, do I surround all those (enemies) yonder.
10. To death do I hand them over, with the fetters of death they have been bound. To the evil messengers of death do I lead them captive.
11. Guide ye those (foes), ye messengers of death; ye messengers of Yama, infold them! Let more than thousands be slain; may the club of Bhava crush them!
12. The Sâdhyas (blessed) go holding up with might one support of the net, the Rudras another, the Vasus another, (Still) another is upheld by the Âdityas.
13. All the gods shall go pressing from above with might; the Angiras shall go on the middle (of the net), slaying the mighty army!
14. The trees, and (growths) that are like trees, the plants and the herbs as well; two-footed and four-footed creatures do I impel, that they shall slay yonder army!
15. The Gandharvas and Apsaras, the serpents and the gods, holy men and (deceased) Fathers, the visible and invisible (beings), do I impel, that they shall slay yonder army!
16. Scattered here are the fetters of death; when thou steppest upon them thou shalt not escape! May this hammer slay (the men) of yonder army by the thousand!
17. The gharma (sacrificial hot drink) that has been heated by the fire, this sacrifice (shall) slay thousands! Do ye, Bhava and Sarva, whose arms are mottled, slay yonder army!
18. Into the (snare of) death they shall fall, into hunger, exhaustion, slaughter, and fear! O Indra and Sarva, do ye with trap and net slay yonder army!
19. Conquered, O foes, do ye flee away; repelled by (our) charm, do ye run! Of yonder host, repulsed by Brihaspati, not one shall be saved!
20. May their weapons fall from their (hands), may they be unable to lay the arrow on (the bow)! And then (our) arrows shall smite them, badly frightened, in their vital members!
21. Heaven and earth shall shriek at them, and the atmosphere, along with the divine powers! Neither aider, nor support did they find; smiting one another they shall go to death!
22. The four regions are the she-mules of the god's chariot, the purodâsas (sacrificial rice-cakes) the hoofs, the atmosphere the seat (of the wagon). Heaven and earth are its two sides, the seasons the reins, the intermediate regions the attendants, Vâk (speech) the road.
23. The year is the chariot, the full year is the body of the chariot, Virâg, the pole, Agni the front part of the chariot. Indra is the (combatant) standing on the left of the chariot, Kandramas (the moon) the charioteer.

24. Do thou win here, do thou conquer here, overcome, win, hail! These here shall conquer, those yonder be conquered! Hail to these here, perdition to those yonder! Those yonder do I envelop in blue and red!

In the Vedic tradition, Varun.a is apa_m s'is'ur, 'child of the waters' (VS 10.7). "You, Agni, are Varun.a when you are born. You are Mitra when kindled. In you, Son of Strength, are all gods." (RV 5.3.1). "You become the eye and protector of great r.ta -- you become Varun.a, since you enter on behalf of r.ta. You become 'Son of the Waters', O Ja_tavedas" (RV 10.8.5). Savitr. is also called Apa_m Napa_t. (RV. 1.22.6; cf. 10.149.2). Apa_m Napa_t may be an appellation of Varun.a and hence may be Ahura *Vouruna of Avestan, the High Lord, ahura berezant. In the R.gveda, waters are the 'wives' of Varun.a, varun.a_ni)(RV 2.32.8; 7.34.22). Waters are Ahura's wives, ahura_ni_ (Y. 38.3).

In the hymn to river-godess, Aredvi_ Su_ra_, a reference appears to a place dedicated to Apam Napa_t. At this place, a worshipper sacrifices to Aredvi_ Su_ra_. (Yt. 5.72). Tis.trya is the god of the rain star; in a hymn to him, "Apam Napa_t distributes to the material world those waters assigned to dwelling-places..." (Yt. 8.34). Apam Napa_t is hailed as 'Ahura' (together with Ahura Mazda_ and Mithra). Yas.t 19 is a hymn dedicated to Earth (Yt. 19.52) and states: "We worship the high Lord, imperial, majestic, Son of the Waters, who has swift horses, the hero who gives help when called upon. (It is) he who created men, he who shaped men, the god amid the waters, who being prayed to is the swiftest of all to hear" (berezantem ahurem xs.avri_m xs.ae_tem apam napa_tem aurvat aspem yazamaide ars.a_nem zavano_, sum, yo_ nere_us. dada, yo_ nere_us. tatas.a, yo_ upa_po_ yazato_ srut gaos.o_ temo_ asti yezimno_). Mithra 'pacifies' (ra_mayeiti); Apam Napa_t restrains (nya_sa_ite); the act of restraining or fettering wrong-doing is a role assigned to Varun.a of R.gveda (vidhr.ti -- cheking, or restraining).

One hymn is addressed to Apa_m Napa_t in R.gveda (RV 2.35.2 : 'Apa_m Napa_t, the Master, has created all beings through his power as Asura; apa_m napa_d asuriyasya mahna_ vis'va_ni aryo_ bhuvana_ jana_na). Yas.t 19 (v.52: yo_ nere_us. daqda, yho_ nere_us. tatas.a): '(Apam Napa_t) created men... shaped men.' Apa_m Napa_t urges the horses in the R.gveda (RV. 7.47.2: a_s'uheman); Apam Napa_t has swift horses in Avesta. In the R.gveda, Apa_m Napa_t is a name given to Agni; in a number of r.ca-s 'Son of the Waters' or Apa_m Napa_t as water-god is identified with Agni. (RV 7.47).

"Thrae_tona is celebrated in Iran not only for a miraculous gift of healing, but also for performing two fabulous feats. One is the defeat of Azi Daha_ka, whom, however, he did not slay but fettered, to live captive until the end of the world, when he will break free for the last great battle...The other stupendous feat attributed to Thrae_tona relates to one Pa_urva, the 'wise steersman', whom he flung into the air so fiercely that he sped across the sky for three days and nights, until Aredvi_ heard his prayer and rescued him, seizing him by the arms and bringing him safely down to earth, there to fulfil his vow of making 1000 libations to her at the river Ranha (Yt. 5.61-5). The fact that the goddess succoured him suggests that Pa_urva was not a wicked person, so this wonderful tale is probably an epic exaggeration of an incident in an actual fight between two warriors of old." (Mary Boyce, 1996, *A History of Zoroastrianism, Vol. I*, Leiden, EJ Brill, p. 100).

Calendar

AV IV.35.4 notes that the year had 360 days and 12 months. (yasma_nma_sa_nirmita_sris'adara_h samvatsaro yasma_nnirmito dva_das'a_rah). An intercalary or supplementary thirteenth month is called sanisrasa (AV II.8.5; V.4.6: XIII.3.8: ahora_trairvimatam tris'adan:gam trayodas'am ma_sam yo_nirmimi_te). Seasons are mentioned

as seven (AV VI.61.2); names gri_s.ma, hemanta, sis'ira, s'arad, vars.a_ and vasanta are mentioned (AV III.11.4; VI.55.2; XII.1.36).

दश मासाञ्छशयानः कुमारो अधि मातरि ।

निरैतु जीवो अक्षतो जीवो जीवन्त्या अधि ॥

RV 5.078.09 May the boy who has reposed for ten months in the bosom of his mother come forth, alive, unharmed, living, from a living (parent).

The reference to 10 months in RV may be a period of gestation.

Vendidad 5.45 echoes this gestation period of 10 months.

It appears that the ancient Avestan calendar of Zoroastrian times post-dates the system of r.tu-s in the tradition of Bha_rata, a system which is post-R.gvedic. So, the thesis which may relate to the relative chronology problem, is: Avestan is a break-away after the R.gvedic period, perhaps during the period of the Bra_hman.a-s.

Sared in Avesta and thard in Darius inscription refer to the year. This is comparable to s'arada (autumn) in the Vedic tradition (cf. the phrase: s'aradah s'atam, 100 autumns).

While the Babylonian year began near the vernal equinox, the ancient Iranian calendar year was perhaps near the autumnal equinox. Mazdasnians of Zoroaster seem to have a year called yar, beginning with the summer solstice. The yar was divided into two parts, from the summer solstice (maidyoshahem or mid-summer) to the winter solstice (maidyarem or mid-year). The name of the gahambar called maidyarem is called the 'cold bringer' in Visperad 1.2, 2.2. Yasht 8.36 may also indicate that the summer solstice was the commencement of the year. When (or after) "the year [again] comes to the end for men the counselor princes (? chieftains) and the wild animals, [who] house in the mountains and the shy [animals who] graze (or wander) in the

plains, watch[when it (the Tishtrya) is in] rising". [After F. Wolff's translation, but Lommel in his Die Yäsht's des Avesta, p. 54 gives the translation as "the annual tilling" (Jahresbestellung)]. The reference to Tishtrya is perhaps a reference to Sirius which had its first heliacal rising in July in the first half of the first millennium BC (in north-eastern Iran it rose about 26th-27th July, i.e. four weeks after the solstice).

This two-fold partition of the year is comparable to the Vedic year, which was divided into two ayanas (uttarâyana and daksinâyana). There is a later division of the year into 6 r.tu-s; this is comparable to the gahs or yairya ratavo (six seasons) of Avestan. This later division seems to suggest that the Avestan and Vedic traditions separated only after the division into 6 r.tu-s was stabilised in Bha_rata which had the tradition of counting a year of 360 days which was a transitional reckoning from a lunar to a solar year (i.e. half-way between 354 and 365 days). This reckoning of 360 days in a year is consistent with Biruni's report of a year of 360 days in the time of Peshdadian dynasty, i.e. in the prehistoric Iranian period. [Al Biruni, p. 11].

[After: S.H. Taqizadeh, 1938, Old Iranian Calendars, Royal Asiatic Society. <http://www.hindunet.org/saraswati/behistun/behistun.htm>

Yama

RV X.16,10.13,18 refer to cremation and burial as methods of disposal of the dead. Pitr.s remembered are both agnidagdha and anagnidagdha (RV X.15.14). AV XVIII.2.34 refers to the custom of exposing the dead: ye nirava_ta_ ye paropta_h ye dagdha ye coddhita_h. This parallels the ancient Iranian custom of exposing their dead to be devoured by birds and vultures. (cf. Alberuni's 'India' II, p. 167). AV XII.2.48: (anad.va_ham plavamanva_rabhadhvam sa vo niravaks.at durita_davadya_t a_rohatu savituh

na_vameta_h s.ad.bhih u_rvi_bhih amatim tadeta) notes that an ox or goat was burnt with the dead body so that the soul of the deceased can ride the animal to go to the land of the pitr.s. Avestan notes this custom. (Yasna Ha 11.4/5; cf. Pahlavi text, 'Shayasta-la-Shayasta. 11.4).

“[In the Epic], the king was burned in the midst of his sorrowing subjects, who came together to witness the pageant. Only children of not more than two years of age were buried in earth...It occurs in a late book that Pa_nd.us hide their arms in a tree, and agree to say, if any one should try to investigate the spot, that it is holy and must not be touched, because ‘according to the family custom, practised by our ancestors, we have hung up in yonder tree the body of our old mother, recently deceased at the age of one hundred and eighty.’ (iv.5.32-33)“ [Edward W. Hopkins, 1889, *The social and military position of the ruling caste in ancient India as represented by the Sanskrit epic*, repr. 1972, Varanasi, Bharat-Bharati, p. 115] This is a remarkable indication of the continuation of the Avestan exposure of dead bodies to birds.

Yama gives a resting place to the dead man (AV XVII.2.37). Yami is his sister (RV 10.10.3); his father is Vivasvat and his mother is Saran.yu (RV X.14.5; X.17.1). Yama was the first mortal that died (AV XVIII.3.13). Yama had owl and pigeon and also two dogs as messengers (AV XVIII.2.11; V.30.6). The dogs Sabala and S'ya_ma_ (AV VIII.1.9) have four eyes, have broad noses and born of Sarama_. They are the guardians of the path (AV XVIII.2.12) where they sit (pathis.adi). [S'va_na is paralled by spana in the Avestan; the concept of hell is common in AV VIII.4.24; V.30.11; Yasna 31.20; Vendidad 3.35; soul was considered immortal: RV X.16.3; Yasna 13.51].

अङ्गिरोभिर् आ गंहि यज्ञियैभिर् यमं वैरूपैर् इह मादयस्व ।

विवस्वन्तं हुवे यः पिता तै ऽस्मिन् यज्ञे बर्हिष्य आ निषद्य ॥

RV 10.014.05 Come here, Yama, with the venerable multiform An:girasas, and be exhilarated; I summon Vivasvat, who is your father, to this sacrifice; be seated on the sacred grass (delight the sacrificer).

यद् उलूको वदति मोघम् एतद् यत् कपोतः पदम् अग्नौ कृणोति ।

यस्य दूतः प्रहित एष एतत् तस्मै यमाय नमो अस्तु मृत्यवे ॥

RV X.165.4 May that which the owl shrieks be in vain, (and may it be in vain) that the pigeon takes his place upon the fire; may this reverence be paid to Yama, (the god of) Death, as whose messenger he is sent.

RV X.14.10-12

अति द्रव सारमेयौ श्वानौ चतुरक्षौ शबलौ साधुना पथा ।

अथा पितृन् सुविदत्रा उपेहि यमेन ये सधमादम् मदन्ति ॥

यौ ते श्वानौ यम रक्षितारौ चतुरक्षौ पथिरक्षी नृचक्षसौ ।

ताभ्याम् एनम् परि देहि राजन् स्वस्ति चास्मा अनमीवं च धेहि ॥

उरूणासाव् असुतृपा उदुम्बलौ यमस्य दूतौ चरतो जनाअनु ।

ताव् अस्मभ्यं दृशये सूर्याय पुनर् दाताम् असुम् अद्येह भद्रम् ॥

RV 10.014.10 Pass by a secure path beyond the two spotted four-eyed dogs, the progeny of Sarama_, and join the wise Pitr.s who rejoice joyfully with Yama. [sa_rameyau... sarama_na_ma_ka_cit devas'uni_tasya_h putrau].

RV10.014.11 Entrust him, O king, to your two dogs, which are your protectors, Yama, the four-eyed guardians of the road, renowned by men, and grant him prosperity and health. [Renowned by men: i.e., renowned in the Vedas, law-books and Pura_n.as].

RV10.014.12 The messengers of Yama, broad-nosed, and of exceeding strength, and satiating themselves with the life (of mortals), hunt mankind; may they allow us this day a prosperous existence here, that we may look upon the sun. [May they allow...the sun: or, may they now restore to us that fair life to look upon the sun (still speaking of the departed worshipper)].

यत्र राजा वैवस्वतो यत्रावरोधनं दिवः ।

यत्रामूरु यद्वतीरु आपस् तत्र माम् अमृतं कृधीन्द्रायेन्दो
परि स्रव ॥

RV 9.113.08 [Let Soma flow] where Vivasvat's son is king, where the inner chamber of the sun (is), where these great waters (are), there make me immortal; flow, Indu, for Indra.

[V.W. Karambelkar, 1959, *The Atharvavedic Civilization*, Nagpur, University of Nagpur].

यो वः सेनानीरु महतो गुणस्य राजा व्रातस्य प्रथमो
बभूव ।

तस्मै कृणोमि न धना रुणधिम दशाहम् प्राचीस् तद्
ऋतं वदामि ॥

10.034.12 Dice, I offer salutation to him who has been the general of your great army, the chief lord of your host; I do not provide him with wealth; I raise my ten (fingers) to the east; that (which) I speak (is) the truth. [I do not provide him wealth: na dana_run.adhmi = I do not withhold my wealth; na sampada_mi].

The king of a gan.a is referred to in r.c.a and there is a clear indication that the r.s.i kavas.a

ailu_s.a or aks.a maujava_n to whom the su_kta is attributed clearly notes that his wealth is not given to the king. They lived in a community sharing food (AV 3.30.56). There is no indication in the R.gveda of any enforced collection of tributes from the vis'. There is a faint indication in the R.gveda that subjects were to make contributions (bali) to ensure the stability of a kin's reign and there is no mention of payment of tributes or taxes. Kingship in ancient Bha_rata of R.gvedic times was a secular institution, in nature contractual, perceived as a trust, subject to approval by the people and most important, subject to a higher law called dharma.

Jana is a term which occurs 275 times in the R.gveda; the term vis' occurs 171 times; and the term sena_ occurs over 20 times. Vis' may refer to common people (agriculturists and traders), as distinct from brahma and ks.atra (priests and warriors).

The term ks.atriya is mentioned nine times in the R.gveda; of these, the term is applied to Varun.a four times, meaning that Varun.a was powerful. (AA Macdonell, *Vedic Mythology*, Strassburg, 1897, p. 25). In S.Br. 12.7.3.12, ra_janya is called ks.atra (again meaning, power or authority). In the Vedic period, both ra_jan and ra_janya included the whole nobility, thus distinguishing the knight from the political function since all groups of society participated in military operations.

Br.hada_ran.yaka Upanis.ad which concludes the S'atapatha Bra_hman.a states that there is nothing higher than ks.atra:

4.1.1.4.11. Verily in the beginning this was Brahman, one only. That being one, was not strong enough. It created still further the most excellent Kshatra (power), viz. those Kshatras (powers) among the Devas, Indra, Varuna, Soma, Rudra, Parganya, Yama, Mrityu, Isana. Therefore there is nothing beyond the Kshatra, and therefore at the Ragasutya sacrifice the Brahmana sits down below the Kshatriya. He confers that glory on the Kshatra alone. But

Brahman is (nevertheless) the birth-place of the Kshatra. Therefore though a king is exalted, he sits down at the end (of the sacrifice) below the Brahman, as his birth-place. He who injures him, injures his own birth-place. He becomes worse, because he has injured one better than himself.

S'Br. notes that Maitra_varun.a is counsel and the power – Mitra, the sacerdotium (Brahma) and Varun.a, the regnum (ks.atra) and adds: 'And the priesthood is the conceiver, and the noble is the doer...So are the two united.' In the evolution of polity in Bha_rata, the alternatives of merger of religion and secular structure or segregation of religion and state did not emerge. S'Br. notes (5.3.3.9) that the law enforcement power passed from Varun.a to the king. Dan.d.ana_yaka became the dharmapati, or lord of the law. Aitareya Bra_hman.a explains the origins of government: gods were defeated by the asuras because the gods had no king. Then the deva-s agree to make Soma their king. Thus kingship is a response to the needs of warfare. Disunited deva-s got defeated and the could succeed only if they yielded to Indra and prayed to him to grant their collective powers.

The concepts of Brahman and ks.atra appear together in R.gveda with an assignment of specific role for the ks.atra. [This may be comparable to the role of the Mitanni warriors of the first half of the second millennium BCE; the Mitanni had by the end of the 16th cent. Gained supremacy in the area of the upper Euphrates – strategically commanding communications between Egypt, Babylon and Anatolia. Their end came ca. 1350-1300 BCE at the hands of the neighbours, the Hittites and Assyrians.]

यद् युञ्जाथे वृषणम् अश्विना रँ घृतेन नो मधुना क्षत्रम्
उक्षतम् ।

अस्माकम् ब्रह्म पृतनासु जिन्वतं वयं धना शूरसाता भ
जेमहि ॥

(di_rghatama_ aucathya) RV 1.157.02 When, As'vins, you harness your bounty-shedding chariot, refresh our strength with trickling honey; bestow (abundant) food upon our people; may we acquire riches in the strife of heroes. [With trickling honey: madhuna_ ghr.tena: madhu iti udakana_ma (Nirukta 1.12.11), madhu may be an adjective for madhura, sweet, with sweet water; or, it may be a substantive for amr.ta, ambrosia, with trickling nectar; or, it may just be honey, in the context of the next hymn where the chariot of the As'vins is termed madhuva_hana, honey-bearing; upon our people: asma_kam brahma pr.tana_su: pr.tana_ = manus.ya (pr.tana_ iti manus.yana_ma--- Nirukta 2.3.25); i.e., children and dependants. Brahma_ = anna, food].

Jana is a general term which may be equated with the early evolution of the concept of state and government as it encompasses perhaps the largest unit. Pan~cajana refers to such a meaning covering all the five groups of people referred to as Anu, Yadu, Turvas'a, Dr.hyu and Puru.

Jana as a unit was headed by janasya gopta_ meaning that he was the protector of the people. The use of the term gopta_ also indicates the pastoral base of the lives of the people. Janapada referring to a republic was a development based on this understanding of the term jana. Paura-janapada may have referred to free cities as republics. Jana was the highest level of political organization. Puru (Bharata) form the Kuru group; Turvas'a and Krivi became the Pan~ca_la. R.gveda uses the term, bha_ratam janam in this context of the state and government (though not understood in the sense in which a separation is understood in present-day nation-states with a separation of the concepts of state and government), protecting the interests of the people, jana. Vedic texts refer to guilds of woodworkers, weavers, weapon-makers, hunters, and other craft and

professional groups indicating a degree of pluralism in society.

**yajño vasánti ná kaut.t.ásya ná kumbhyai
bhástra_yai ha smárs.ayo gr.hn.anti
tadvr.s.iinprati bhástra_yai
yáju_m.s.yaasustaányetárhi praákr.ta_ni
yajñaadyajñam nirmimaa íti tásmaadánasa
evágr.hn.ii_ya_t** (S'Br. 1.1.2.7)

In this verse, a cart full of cereals is equated with the yajn~a. This was the period of the bra_hman.as when agricultural cultivation extended beyond wheat and rice to several pulses and lentils.

The hymn AV 4.22 is a remarkable prayer intended to ensure the king's well-being. It is a beautiful expression of the heroic framework of the solidity of the Bha_rata ra_s.t.ra in its early phases of evolution. The ra_s.t.ra was the basis of a society larger than a community based on kinship ties. The yajn~a performed the integrating role re-inforcing the maintenance of cooperative nature of the society:

AV IV, 22. Charm to secure the superiority of a king.

1. This warrior, O Indra, do thou strengthen for me, do thou install this one as sole ruler (bull) of the Vis (the people); emasculate all his enemies, subject them to him in (their) contests!

2. To him apportion his share of villages, horses, and cattle; deprive of his share the one that is his enemy! May this king be the pinnacle of royalty; subject to him, O Indra, every enemy!

3. May this one be the treasure-lord of riches, may this king be the tribal lord of the Vis (the people)! Upon this one, O Indra, bestow great lustre, devoid of lustre render his enemy!

4. For him shall ye, O heaven and earth, milk ample good, as two milch-cows yielding warm

milk! May this king be favoured of Indra, favoured of cows, of plants, and cattle!

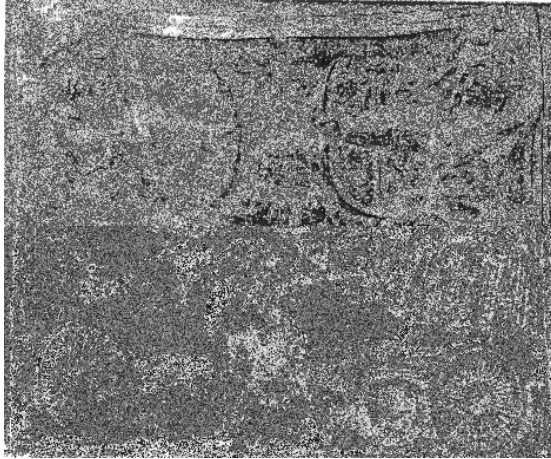
5. I unite with thee Indra who has supremacy, through whom one conquers and is not (himself) conquered, who shall install thee as sole ruler of the people, and as chief of the human kings.

6. Superior art thou, inferior are thy rivals, and whatsoever adversaries are thine, O king! Sole ruler, befriended of Indra, victorious, bring thou hither the supplies of those who act as thy enemies!

7. Presenting the front of a lion do thou devour all (their) people, presenting the front of a tiger do thou strike down the enemies! Sole ruler, befriended of Indra, victorious, seize upon the supplies of those who act as thy enemies!

Vedic Ratha

Terracotta panel of a fight between



Yudhis.t.hira (left) and Jayadratha (right), a scene from the Great Epic war. Both are archers shooting from their chariots; bows are held in *samasandhana* pose. Two quivers are filled with arrows and tied on left and right shoulders. Jayadratha is shooting a ks.urapra type of arrows. Gupta art, 5th cent. AD. Ahichchhatra (UP), National Museum, New Delhi. [After Pl. IX, GN Pant, 1978].

Jaya_, a daughter of Daks.a (a r.s.i) became, according to a promise of Brahma, the creator, the mother of all weapons, including missiles. All these weapons are personified. They are divided into four great classes within 'mukta' or thrown class of twelve types of weapons.



The Yantramukta (thrown by machines); the Pa_n.imukta (thrown by hand); the Muktasandharita (thrown and drawn back); and the Mantramukta (thrown by mantra and numbering six types). Another classification of weapon types is 'amukta' (unthrown) consisting of twenty types of weapons. Another classification is 'mukta_mukta' (either thrown or unthrown) comprising 98 types of weapons. The body itself is a weapon with the hands becoming weapons in a warfare called ba_huyuddha. Dhanu the bow is personified: a small face, a broad neck, a slender waist and a strong back; four cubits high, bent in three places; with tusks in the mouth; colour of blood, adorned with a garlands of entrails.

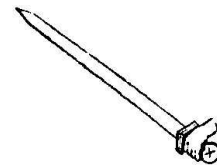


Bhiroo is the Hindu god of war. (Tod II, 523).

Hindu warriors. From memorial

stones of Bijanagar, of which the Kensington Museum possesses photographs. After Fig. 233 in Burton, 1884, p. 215.

Cuttack. Battle scene from a cave. 1st cent. CE. Fig. 235, in Burton, 1884, p. 216. One soldier carries a broad-sword. A chopper with a tooth on the back is wielded in the left hand of a warrior, while the right hand holds the shield. The chopper may be a kukri (seen in the British Museum with a blade inscribed in Pali; Mhars use the choppers to behead buffaloes offered to Ka_l.i.



Arjuna's sword.

Elephant caves. Arjuna carries in the right hand, perpendicularly and point upwards, a short, straight

blade, with a beveled point; there is a small hand-guard; the fist fills the grip; the large pommel confines the hand.

Woods used for making Vedic ratha and axle

Egyptian chariots with parts made of elm, ash, oak and birch (imports from south Russia).

Vedic vehicle is made of indigenously available woods of **s'almali** (10.85.20: also **kimsuka**?) or of **khadira** and **s'ims'apa** (3.53.19) and its axle of **arat.u** (8.46.27) -- all these woods are native to India and there is no memory of woods of the temperate climates of Europe.

It would, therefore, be inappropriate to make an assumption, as some indologists do, that the ratha mentioned in the R.gveda is an import from outside of Bharat or brought in by invading or migrating indo-europeans who enter into Bharat.

sukims'ukam s'almalim vis'varu_pam hiran.yavarn.am suvr.tam sucakram a_ roha su_rye amr.tasya lokam syonam patye vahatum kr.n.us.va

su_rya_ sa_vitri_ (r.s.ika) 10.085.20 Ascend, Su_rya, the chariot made of good kim.s'uka wood and of s'almali, multiform, decorated with gold, well-covered, well-wheeled, prepare the happy world of the immortals, your marriage procession to your husband. [The r.ca is recited when the bride goes to the house of the husband. amr.tasya lokam = the world of immortality; or, the abode of the Soma, the object of aroha, ascend].

sal = shorea robusta (Santali.lex.) Ebony: s'almali wood used to make chariot-wheels (RV. x.85.20)(Vedic.lex.)

s'a_la the tree vatica robusta or shorea robusta (MBh.); sa_la shorea robusta (Pali.Pkt.); sa_l (P.N.B.H.M.); xa_l (A.); sa_la (Or.); sal, hal the tree vateria acuminata (Si.) (CDIAL 12412). ca_lam sal; Ceylon ebony; tree (Ta.lex.) yamakasa_la_ pl. the two sa_l trees between which Buddha died (Pali); imal pair of sa_l trees (Si.)(CDIAL 10423). cf. karumaram shorea robusta, ebony (Ma.)(DEDR 1282). cf. tumpi Ceylon ebony, diospyros tomentosa

(Ta.)(DEDR 3329). cf. ke_ndu a kind of ebony, diospyros embryopteris (SKt.)(CDIAL 3464). Vatica robusta: ca_lam Ceylon ebony; ca_li id. (Ce_tupu. Ce_tuvan. 9) (Ta.lex.) banapu a large timber-tree, terminalia tomentosa, var. coriacea (Ka.)(DEDR 3885).

khayar = acacia catechu (Santali.lex.) 1471. Flowers for saffron dye: kesu, kesur.a~_ pl. the flowers (used for making a saffron dye)(G.); kesur.i_ the tree (G.); kim.s'uka the tree butea frondosa (MBh.); kaim.s'uka pertaining to b. frondosa (Sus'r.); kim.suka the tree (Pali); kim.sua the tree, the flower (Pkt.); ke_sua (Pkt.); kesu_ the tree (S.H.); ke_su_phull the flowers (L.)[<Drav. is supported by NIA forms which have no nasal; H. also has tesu_](CDIAL 3149). ke_caram < ke_s'ara filaments of a flower, stamens (Tiva.); saffron; ke_cari wheat flour boiled with saffron and sugar (Ta.lex.)

Acacia catechu, acacia wallichiana, acacia polyacantha: khadira (extract) (SKt.M.Ka.); catechu (English); khair, katha, kottha fooflee sooparee (dye)(H.); khair, khayer (M.B.); khaira, khaderi (M.); khair (Gwalior); kher, kath-khar (G.Deccan); podalimanu, poogamu, kachu (dye); kaviri-sandra (Te.); voadalam, karangalli, kasku-kutta, wothalay, kasha-katti (dye)(Ta.); khadiram (Ma.); kathu (Konkan.i); kachu (dye)(Ka.); khaiyar (Santal); khoira (A.); khoiru (Or.); ratkihiri (S.); sha (Burmese); habitat: common in forests of India and Burma

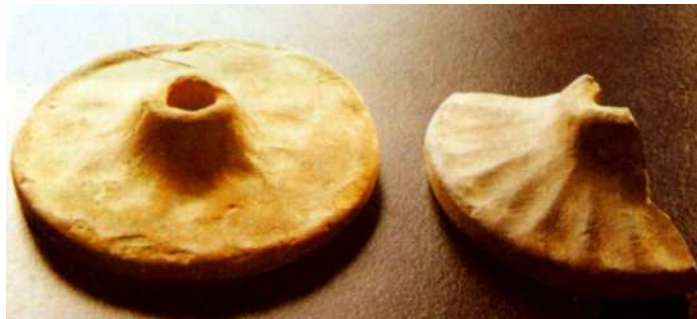
sisu = dalbergia (Santali.lex.) 3146. Dalbergia latifolia; blackwood: s'im.sapa wood used to make chariots (RV. iii.53.19)(Vedic.lex.) s'am.sapa derived from dalbergia sissoo (AV. vi.129.1); s'im.s'apa dalbergia sissu (RV. iii.53.19)(Vedic.lex.) s'im.s'apa_ dalbergia sissoo is the si_sam tree; its wood is strong and durable and is recommended for furniture (B.Sam.) s'ims'apa_ dalbergia sissoo (Car. Su. 25.49, Ci. 1-2.12). s'im.s'apa_ the tree dalbergia sissoo (AV.); s'is'apa_ (R.); s'i_s'am (Pers.); si_sam (P.); s'i_sam (H.); sisam (G.); s'ewa (Psht.); sim.sapa_ dalbergia sissoo (Pali);

si_sava_, si_sama (Pkt.); s'ewa (Pas'); s'i_su poplar (Sh.); sissu_ (P.); si_so~, si_ho~ dalbergia sissoo (P.); sisau (N.); xixu (A.); sisu (B.Or.); si_so (H.); si_so~, sisai_ (H.); s'isav, s'i~sav, s'i~sava_, s'isa_, s'isvi_, s'is'i_ (M.)(CDIAL 12424). s'i~svel, s'i~svyel oil from the wood of dalbergia sissoo (M.)(CDIAL 12425). i.t.t.i blackwood, dalbergia latifolia (Ta.); cicupam < s'im.s'upa shisham, nu_kku (Kampara_. Cat.a_yu. 146)(Ta.lex.)

abhi vyayasva khadirasya sa_ram ojo dhehi spandane s'im.s'apa_ya_m aks.a vi_lo vi_lita vi_layasva ma_ya_ma_d asma_d ava ji_hipo nah

vis'va_mitra ga_thina 3.053.19 Fix firmly the substance of the khayar (axle), give solidity to the s'is'u (floor) of the car; strong axle, strongly fixed by us, be strong; cast us not from out of our conveyance. [khayar and s'is'u: khadirasya sa_ram is the text; khadira = mimosa catechu of which the bolt of the axle is made; while the s'im.s'apa, dalbergia sisu furnishes wood for the floor; these are still timber-trees in common use].

yo ma imam cid u tmana_mandac citram da_vane



arat.ve
aks.e
nahus.e

sukr.tvani sukr.ttara_ya sukratuh

vas'a as'vya 8.046.27 He who of his own will has been pleased to give me this honoured gift, he, performer of good works, (has determined)

on a pre-eminently good action, amid Aratva, Nahus.a and Sukr.tvan. [Maybe, names of kings or officers of Pr.thus'ravas].

455.Colosanthos indica: ara_t.aki_ name of a plant (AV. iv.37.6); arat.va made of the Arat.u tree; name of a man (RV. viii.46.27); arad.u, arat.u the tree colosanthos indica (AV. xx.131.15)(Vedic.lex.)390.Heart of a tree: arat.t.ha hard, stiff (of leather)(N.); arat.uva_ heart or hard part of a tree (Si.)(CDIAL 1303).

Spoked chariot-wheel of Sarasvati Civilization

Rakhigarhi: Terracotta wheel. The painted lines radiating from the central hub. Mature Harappan. (Courtesy ASI)



Kalibangan: terracotta wheel with painted spokes. Mature Harappan (Courtesy ASI)

Banawali: terracotta wheels. Spokes in low relief. Mature Harappan (Courtesy ASI)

Ratnins; and the importance of chariotsⁱⁱⁱ in the 3rd/2nd millennium BCE

In the historical tradition of Bharat, a charioteer is a *ratnin*, a ra_janya, a vra_tya – this tradition dates back to the R.gvedic times where the ratha metaphor is intensely used.

The importance of the chariot-maker or charioteer -- *su_ta*, *ks.attr.*, *sam.grahi_tr.*, *taks.a-rathaka_ra* -- can be seen from the prestige accorded to these four directly involved with chariotry or equerry, out of 11 or 12 ratnins during the period of the Bra_hman.a texts.

Ratnin were *ra_janya* and *ra_janya* were *vra_tya*.

List of ratnins, according to TS, TB, in whose houses, yajn~a is performed for 12 days, one day assigned to each ratnin (in parenthesis, the alternate names and the daks.ina offered to the ratnin are listed):

brahman (purohita; white-backed ox), **ra_janya** (*ra_jan* or *yajama_na*; bull), **mahis.i** (first consort; cow), **va_va_ta_** (favourite; four-year old cow), **parivr.kti** (superseded consort; reddish-white mutilated --*apasphura*--cow or same with broken horns or black, wornout, ill cow), **sena_ni_** (commander-in-chief; gold), **su_ta** (charioteer, equerry), **gra_man.i** (*vais'ya-gra_man.i_*; village headman, troop-commander; great castrated ox or reddishbrown ox or horse or dappled cow or dappled ox), **ks.attr.** (chamberlain, charioteer; treasurer, messenger or factotum (*sarvaka_rin*); speckled ox or reddish-white ox or reddish-white draught-ox), **sam.grahi_tr.** (collector, charioteer; two cows feeding the same calf or twin bull-calves or two bull-calves born after each other), **bhagadugha** (divider, collector; collector of king's share (*maha_na_si_ka* or cook, carver) or *yo bha_gala_bhi_ dogdhi* - collector whose charge is met by a share in the produce --; or, surveyor of the royal herds (*gopa_laka*); black ox), **aks.a_va_pa** (givicarta; surveyor of the dicing-hall and slaughterer; speckled ox with raised tail (*udva_ra*), **taks.a-rathaka_ra** (carpenter, cartmaker; iron utensils: objects wrapped in or made of horse hair and/or sword, halter or strangling noose, dice box and a male animal), **pa_la_gala** (*anr.tadu_ta*; leather coated -- *pyuks.n.a*-- bow,

leather quivers with arrows, red turban or three quivers with arrows or a bow wrapped in reed).

MS sequence: **brahman**, **ra_jan**, **mahis.i_**, **parivr.kti**, **sena_ni_**, **sam.grahi_tr.**, **ks.attr.**, **su_ta**, **vais'ya-gra_man.i_**, **bha_gadugha**, **taks.a-rathaka_ra**, **aks.a_va_pa-govi_karta**

KS sequence is the same as MS but lists only 11, excluding the **rathaka_ra**

White Yajurveda sequence: **sena_ni_**, **purohita**, **su_yama_na**, **mahis.i**, **su_ta**, **gra_man.i_**, **ks.attr.**, **sam.grahi_tr.**, **bha_gadugha**, **aks.a_va_pa-govi_karta**, **pa_la_gala**, **parivr.tti** (who is driven out of the king's realm after the *Nirr.ti* offering)

Ratha metaphor in the R.gveda

The *r.cas* which refer to the 'wheel' or 'spoked-wheel' are in R.gveda *Su_kta* RV 1.162. The *su_kta* is a complex metaphor and is principally related to astronomical knowledge of the vedic times.

This *Su_kta* is also important in the context of cosmology as perceived in Vedic times. The metaphor of the 'ratha' and the 'spoked-wheel' is intense. This leads some scholars to surmise that the R.gveda should be dated to 2nd millennium BC, a date related to the archaeological/metallurgical theses related to the finds of the spoked-wheel and the hard metal alloy needed to fix the axle of the 'ratha'.

In this *Su_kta*, there is only one reference to a ratha, chariot in RV 1.164.03 -- a metaphorical seven-wheeled chariot. This may lead to a surmise that the spoked-wheel refers to the 'potter's wheel' and not to the wheel of a ratha. Of course, in the context of the planetary movements, the speed may relate to a fast-moving chariot; a chariot with solid wheels is, however, evidenced in Mesopotamia in the context of royalty and a copper model of a chariot box has been found in Chanhudaro (ca. 2000 BC).

Even assuming for the sake of argument that the archaeological/metallurgical theses are valid, these do not negate the thesis that the R.gveda should be dated to the pre-bronze age, to the chalcolithic periods. True bronze was not necessary to fix the axle; any naturally-occurring copper alloy containing zinc or arsenic or a copper pyrite would have yielded enough hardness to support the jointing.

The determination of the date of invention of the spoked-wheel (for use by the potter and for use on a 'ratha') is a topic for further research.

r.s.i: di_rghatama_ aucatthya; _, 1-41
vis'vedava_, 42 prathama_rddha va_k,
dviti_ya_rddha a_pa, 43 prathama_rddha
s'akadhu_ma, dviti_ya_rddha soma; 44
agni, su_rya, va_yu, 45 va_k, 46-47 su_rya, 48
sam.vatsaraka_lacakra varn.ana,
49 sarasvati_, 50 sa_dhya, 51 su_rya, parjanya,
agni, 52 sarasva_n, su_rya;
chanda: tris.t.up, 12, 15, 23, 29, 36, 41 jagati_,
42 prasta_ra pank;ti, 51 anus.t.u

अस्य वामस्य पलितस्य होतुस् तस्य भ्राता मध्यमो
अस्त्य अश्वः ।

तृतीयो भ्राता घृतपृष्ठो अस्यात्रापश्यं विशपतिं
सप्तपुत्रम् ॥

सप्त युञ्जन्ति रथम् एकचक्रम् एको अश्वो वहति
सप्तनामा ।

त्रिनाभि चक्रम् अजरम् अनर्व यत्रेमा विश्वा भुवनाधि
तस्थुः ॥

इमं रथम् अधि ये सप्त तस्थुः सप्तचक्रं सप्त वहन्त्य
अश्वाः ।

सप्त स्वसारो अभि सं नवन्ते यत्र गवां निहिता सप्त
नाम ॥

को ददर्श प्रथमं जायमानम् अस्थन्वन्तं यद् अनस्था
बिभर्ति ।

भूम्या असुर असृग् आत्मा क्व स्विन् को विद्वालतसम्
उप गात् प्रष्टुम् एतत् ॥

पाकः पृच्छामि मनसाविजानन् देवानाम् एना निहिता
पदानि ।

वत्से बृष्कये ऽधि सप्त तन्तून् वि तन्त्रि क्वय ओतुवा
उ ॥

अचिकित्वाञ् चिकितुषश् चिद् अत्र क्वीन् पृच्छामि
विद्वाने न विद्वान् ।

वि यस् तस्तम्भ षळ इमा रजास्य अजस्य रूपे किम्
अपि स्विद् एकम् ॥

इह ब्रवीतु य ईम् अङ्ग वेदास्य वामस्य निहितम् पदं
वेः ।

शीर्ष्णः क्षीरं दुहते गावो अस्य वत्रिं वसाना उदुकम्
पदापुः ॥

माता पितरम् ऋत आ बभाज धीत्य् अग्रे मनसा सं
हि जग्मे ।

सा बीभत्सुर गर्भरसा निर्विद्धा नमस्वन्त इद् उपवाकम्
ईयुः ॥

यु मातासीद् धुरि दक्षिणाया अतिष्ठद् गर्भो वृजनीष्
अन्तः ।

अमीमेद् वत्सो अनु गाम् अपश्यद् विश्वरूप्यं त्रिषु
योजनेषु ॥

तिष्ठो मातृस् त्रीन् पितृन् बिभ्रद् एक ऊर्ध्वस् तस्थौ
नेम् अव ग्लापयन्ति ।

मन्त्रयन्ते दिवो अमुष्य पृष्ठे विश्वविदं वाचम्
अविश्वमिन्वाम् ॥

द्वादशारं नहि तज् जरायुर्वर्ति चक्रम् परि द्याम्
 ऋतस्य ।
 आ पुत्रा अग्रे मिथुनासो अत्र सप्त शतानि
 विलतशतिश् च तस्थुः ॥
 पञ्चपादम् पितरं द्वादशाकृतिं दिव आहुः परे अर्धे
 पुरीषिणाम् ।
 अथेमे अन्य उपरे विचक्षणं सप्तचक्रे षळर आहुर
 अर्पितम् ॥
 पञ्चारे चक्रे परिवर्तमाने तस्मिन् आ तस्थुर भुवनानि
 विश्वा ।
 तस्य नाक्षस् तप्यते भूरिभारः सनाद् एव न शीर्यते
 सनाभिः ॥
 सनैमि चक्रम् अजरं वि वावृत उत्तानायां दश यु
 वहन्ति ।
 सूर्यस्य चक्षु रजसैत्य् आवृतं तस्मिन् आर्पिता भ
 ुवनानि विश्वा ॥
 साकंजानां सप्तथम् आहुर एकजं षळ इद् युमा ऋषयो
 देवजा इति ।
 तेषाम् इष्टानि विहितानि धामश स्थात्रे रैजन्ते विकृतानि
 रूपशः ॥
 स्त्रियः सतीस् ता५ उ मे पुंस आहुः पश्यद् अक्षुण्वान्
 न वि चैतद् अन्धः ।
 कविर् यः पुत्रः स ईम् आ चिकेत यस् ता विजानात्
 स पितुष् पितासत् ॥
 अवः परेण पर एनावरेण पदा वत्सम् बिभ्रती गौर उद्
 अस्थात् ।
 सा कद्रीची कं स्विद् अर्धम् परागात् क्व स्विद् सूते
 नहि यूथे अन्तः ॥

अवः परेण पितरं यो अस्यानुवेद पर एनावरेण ।
 कवीयमानः क इह प्र वौचद् देवम् मनः कुतो अधि
 प्रजातम् ॥
 ये अवाञ्चस् ता५ उ पराच आहुर ये पराञ्चस् ता५ उ
 अवाच आहुः ।
 इन्द्रश् च या चक्रथुः सोम तानि धुरा न यु रजसो
 वहन्ति ॥
 द्वा सुपर्णा सयुजा सखाया समानं वृक्षम् परि षस्वजाते
 ।
 तयोर् अन्यः पिप्पलं स्वाद्वक्त अत्त्य् अनश्नन् अन्यो
 अभि चाकशीति ॥
 यत्रा सुपर्णा अमृतस्य भागम् अनिमेषं विदथाभि
 स्वरन्ति ।
 इनो विश्वस्य भुवनस्य गोपाः स मा धीरः पाकम् अत्रा
 विवेश ॥
 यस्मिन् वृक्षे मध्वदः सुपर्णा निविशन्ते सुवते चाधि
 विश्वे ।
 तस्येद् आहुः पिप्पलं स्वाद्वक्त अग्रे तन् नोन् नशद् यः
 पितरं न वेद ॥
 यद् गायत्रे अधि गायत्रम् आहितं त्रैष्टुभाद् वा त्रैष्टुभं
 निरतक्षत ।
 यद् वा जगज् जगत्य् आहितम् पदं य इत् तद् विदुस्
 ते अमृतत्वम् आनशुः ॥
 गायत्रेण प्रति मिमीते अर्कम् अर्केण साम त्रैष्टुभेन
 वाकम् ।
 वाकेन वाकं द्विपदा चतुष्पदाक्षरेण मिमते सप्त वाणीः ॥
 जगता सिन्धु दिव्य अस्तभायद् रतरे सूर्यम् पय
 अपश्यत् ।

गायत्रस्य समिधस् तिस्र आहुस् ततो महा प्र रिरिचे
 महित्वा ॥
 उप ह्वये सुदुर्घा धेनुम् एतां सुहस्तौ गोधुग् उत्त दौहद्
 एनाम् ।
 श्रेष्ठं सवं सविता साविषन् नो ऽभीद्धो घर्मस् तद् उ षु
 प्र वोचम् ॥
 हिङ्गुण्वती वसुपत्नी वसूनां वत्सम् इच्छन्ती मनसाभ्य
 आगात् ।
 दुहाम् अश्विभ्याम् पयो अघ्नयेयं सा वर्धताम् महते
 सौभगाय ॥
 गौर अमीमेद् अनु वत्सम् मिषन्तम् मूर्धानं हिङ्ङ्
 अकृणोन् मातवा उ ।
 सुक्वाणं घर्मम् अभि वावशाना मिमाति मायुम् पयते
 पयोभिः ॥
 अयं स शिं येन गौर अभीवृता मिमाति मायुं ध्वसनाव्
 अधि श्रिता ।
 सा चित्तिभिर् नि हि चकार मर्त्यं विद्युद् भवन्ती प्रति
 वव्रिम् औहत ॥
 अनच् छये तुरगातु जीवम् एजद् ध्रुवम् मध्य आ
 पस्त्यानाम् ।
 जीवो मृतस्य चरति स्वधाभिर् अमर्त्यो मर्त्येना
 सयोनिः ॥
 अपश्यं गोपाम् अनिपद्यमानम् आ च परां च पथिभिश्
 चरन्तम् ।
 स सग्रीचीः स विषूचीर् वसान आ वरीवर्ति भुवनेष्व्
 अन्तः ॥
 य ई चकार न सो अस्य वेद य ई ददर्श हिरुग् इन् नु
 तस्मात् ।

स मातुर योना परिवीतो अन्तर बहुप्रजा निवर्धतिम् आ
 विवेश ॥
 द्यौर मे पिता जनिता नाभिर् अत्र बन्धुर मे माता
 पृथिवी महीयम् ।
 उत्तानयोश् चम्बोर् योनिर् अन्तर अत्रा पिता दुहितुर
 गर्भम् आधात् ॥
 पृच्छामि त्वा परम् अन्तम् पृथिव्याः पृच्छामि यत्र भ
 ुवनस्य नाभिः ।
 पृच्छामि त्वा वृष्णो अश्वस्य रेतः पृच्छामि वाचः परमं
 व्योम ॥
 इयं वेदिः परो अन्तः पृथिव्या अयं यज्ञो भुवनस्य
 नाभिः ।
 अयं सोमो वृष्णो अश्वस्य रेतो ब्रह्मायं वाचः परमं
 व्योम ॥
 सप्तार्धगर्भा भुवनस्य रेतो विष्णोस् तिष्ठन्ति प्रदिशा
 विधर्मणि ।
 ते धीतिभिर् मनसा ते विपश्चितः परिभुवः परि भवन्ति
 विश्वतः ॥
 न वि जानामि यद् इवेदम् अस्मि निण्यः सृलतनद्धो
 मनसा चरामि ।
 यदा मार्गान् प्रथमजा ऋतस्याद् इद् वाचो अश्रुवे भ
 ागम् अस्याः ॥
 अपाङ् प्राङ् एति स्वधया गृभीतो ऽमर्त्यो मर्त्येना
 सयोनिः ।
 ता शश्वन्ता विषूचीनां वियन्ता न्य अन्यं चिक्थुर न नि
 चिक्थुर अन्यम् ॥
 ऋचो अक्षरै परमे व्योमन् यस्मिन् देवा अधि विश्वे
 निषेदुः ।

यस् तन् न वेद किम् ऋचा करिष्यति य इत् तद्
 विदुस् त इमे सम् आसते ॥
 सूयवसाद् भगवती हि भूया अथो वयम् भगवन्तः
 स्याम ।
 अद्धि तृणम् अघ्न्ये विश्वदानीम् पिब शुद्धम् उदुकम्
 आचरन्ती ॥
 गौरीर् मिमाय सलिलानि तक्षत्य् एकपदी द्विपदी सा
 चतुष्पदी ।
 अष्टापदी नवपदी बभ्रुवृषी सहस्राक्षरा परमे व्योमन् ॥
 तस्याः समुद्रा अधि वि क्षरन्ति तेन जीवन्ति प्रदिशश्
 चतस्रः ।
 ततः क्षरत्य् अक्षरं तद् विश्वम् उप जीवति ॥
 शक्रमयं धूमम् आराद् अपश्यं विषुवता पर एनावरेण ।
 उक्षाणम् पृश्निम् अपचन्त वीरास् तानि धर्माणि
 प्रथमान्य् आसन् ॥
 त्रयः केशिनः ऋतुथा वि चक्षते सृलतवत्सरे वपत एक
 एषाम् ।
 विश्वम् एकौ अभि चष्टे शचीभिर् ध्राजिर् एकस्य ददृशे
 न रूपम् ॥
 चत्वारि वाक् परिमिता पदानि तानि विदुर् ब्राह्मणा ये
 मनीषिणः ।
 गुहा त्रीणि निहिता नेङ्गयन्ति तुरीयं वाचो मनुष्या
 वदन्ति ॥
 इन्द्रम् मित्रं वरुणम् अग्निम् आहुर् अथो दिव्यः स
 सुपर्णो गुरुत्मान् ।
 एकं सद् विप्रा बहुधा वदन्त्य् अग्निं यमम् मातरिश्वानम्
 आहुः ॥
 कृष्णं नितानं हरयः सुपर्णा अपो वसाना दिवम् उत्

पतन्ति ।
 त आववृत्रन् सदेनाद् ऋतस्याद् इद् घृतेन पृथिवी व्य
 उद्यते ॥
 द्वादश प्रधयश् चक्रम् एकं त्रीणि नभ्यानि क उ तच्
 चिकेत ।
 तस्मिन् साकं त्रिंशता न शङ्कवोऽर्पिताः षष्टिर् न
 चलाचलासः ॥
 यस् ते स्तनः शशयो यो मयोभूर येन विश्वा पुष्यसि
 वार्याणि ।
 यो रत्नधा वसुविद् यः सुदत्रः सरस्वति तम् इह धातवे
 कः ॥
 युज्जेन युज्जम् अयजन्त देवास् तानि धर्माणि प्रथमान्य्
 आसन् ।
 ते ह नाकम् महिमानः सचन्त यत्र पूर्वे साध्याः सन्ति
 देवाः ॥
 समानम् एतद् उदुकम् उच् चैत्य् अव चाहभिः ।
 भूमिम् पर्जन्या जिन्वन्ति दिवं जिन्वन्त्य् अग्नयः ॥
 दिव्यं सुपर्णं वायसम् बृहन्तम् अपां गर्भं दर्शतम्
 ओषधीनाम् ।
 अभीपतो वृष्टिभिस् तर्पयन्तं सरस्वन्तम् अवसे
 जोहवीमि ॥

1.164.01 I have beheld the Lord of men with
 seven sons; of which delightful and benevolent
 (deity), who is the object of our invocation,
 there is an all-pervading middle brother, and a
 third brother, well fed with (oblations of) ghee.
 [Seven sons: seven solar rays; A_ditya, the
 seventh son of Aditi; a third brother: Va_yu and
 Agni, the younger brothers of A_ditya:
 Parames'vara = A_ditya, the three sons refer to
 the attributes of Parames'vara of creating,
 preserving and destroying]. [The su_kta
 enunciates the doctrines of veda_nta, the

spiritual unity of Brahma and the universe; Aditya or the sun, is glorified and identified with all creation. S'aunaka explains the sukta at the level of repentance for a crime: if a Brahmana has committed theft, he may expiate the offence by fasting three nights and repeating the sukta silently].

1.164.02 They yoke the seven (horses) to the one-wheeled car; one horse, named seven, bears it along; the three-axled wheel is undecaying, never loosened, and in it all these regions of the universe abide. [One-wheeled car: either the orb of the sun, or time, or a year; the seven horses may be the seven solar rays, or the six seasons, with their aggregation and year; or the six double months, and the intercalary month; or the seven days of the week; the wheels of the car, as typical and identical are said to be one; one horse; eko as'vo saptama = the Sun or Aditya, either as the absorber of the seven flavours, or as praised by the seven rsis; it may be a pun, since sapta = a horse, seven; three-axled wheel: the day with its three sandhyas; or time, past, present and future; all these regions: all things are dependent upon time, which of itself is imperishable: anadinidhanah kalah, time is without beginning or end].

1.164.03 The seven who preside over this seven-wheeled chariot (are) the seven horses who draw it; seven sisters ride in it together, and in are deposited the seven forms of utterance. [The seven: either the solar rays or the seven portions of a year: ayana (solstine season), month, fortnight, day, night, hour; seven horses: seven wheels and seven horses are the seven solar rays; seven sisters: either the rays of the sun, or the six seasons and the aggregate year of the six double and one intercalary month; seven forms of utterance: seven notes of music as employed in chanting the praises of the Sun; or, if gavam is used in the sense of water, the seven forms may be the seven divine rivers].

1.164.04 Who has seen the primeval (being) at the time of his being born; what is that endowed with substance which the unsubstantial sustains; from earth are the breath

and blood; but where is the soul; who may repair to the sage to ask this? [That endowed with substance: asthanvantam yad anastha bibharti = lit., that which having bone the boneless sustains; the boneless is the prakrti of the san:khyas, or the maya of the vedantins, which is formless matter, or spiritual illusion, from which the material and visible world proceeds; where is the soul: bhumya asur-asr.g-atma kva svit: bhumis = sthula s'ari-ra, gross body; asuh = breath, the sukshma s'ari-ra, or subtle body; asrj = blood, the aggregate elements of which the body

is formed; atma or cetana, the thinking principle, although connected with gross and subtle form, is nowhere perceptible as a separate object, and not to be apprehended, either by pupil or teacher].

1.164.05 Immature (in understanding) undiscerning in mind, I inquire of those things which are hidden (even) from the gods; (what are) the seven threads which the sages have spread to envelop the sun, in whom all abide? [Immature: pakah = lit. ripening, being or making mature; here, it is equated with paktavyah, what is to be matured; apakvamatiraham, I of immature mind; seven threads: sapta tantun = seven forms of the soma sacrifice, or the seven metres of the vedas; the seen:

vatse bas.kaye adhi: vatse = sarvasya niva sa bhumte; bas.kaye = aditye; the lit. meaning is, a yearling calf, just as vatsa also means a calf; the term vatse is already used, hence, bas.kaya = time or the sun].

1.164.06 Ignorant, I inquire of the sages who know (the truth); not as one knowing (do I inquire), for the sake of (gaining) knowledge; what is that one alone, who has upheld these six spheres in the form of the unborn? [What is that one alone: yas tastambha s'ad ima raja_m.sis ajasya rupe kim apisvidekam: the 'one' is: 1) the orb of the ungenerated sun on which the six seasons depend; 2) satyaloka, whence there is no return, the stay of the other six worlds or regions; 3)

the sole form of the unborn creator].
1.164.07 Let him who knows this (truth) quickly declare it; the mysterious condition of the beautiful ever-moving (sun); the rays shed (their) milk from his (exalted) head investing his form with radiance; they have drunk up the water by the paths (by which they were poured forth). [By the paths: the solar rays, which shed down rain and also reabsorb water].

1.164.08 The mother, (earth), worships the father, (sun), with holy rites, for the sake of water; but he has anticipated (her wants) in his mind; whereupon desirous of progeny, she is penetrated by the dews of impregnation, and, (all) expectant of abundance, exchange words (of congratulation). [Exchange words: metaphysical account of the agency of the sun sending rain upon the earth and its consequent fertility].

1.164.09 The mother, (sky), was associated in (sustaining) the burden of the fulfiller of desires, (the earth); the embryo (water) rested within the (womb of the) clouds; thereupon the calf bellowed, and beheld the omniform cow in the three combinations. [The calf bellowed: the cloud thundered; the omniform cow: vis'varu_pyam ga_m tris.u yojanes.u = the earth diversified by various crops in consequence of the co-operation of the cloud, the wind, and the rays of the sun].

1.164.10 The one sole (sun), having three mothers and three fathers, stood on high; none ever over-weary him; the (gods) on the summit of the sky take counsel respecting him in language all-comprehending (but) not extending to all. [Three mothers and three fathers: the three worlds, earth, sky, heaven; and the three deities presiding over them: agni, va_yu, su_rya; in language: vis'avidam va_cam avis'vaminva_m = speech or discourse, knowing all, or which may be known by all; or, that which does not extend to all, a-sarvavya_pini_m; speech = thunder: va_cam garjitalaks.an.am].

1.164.11 The twelve-spoked wheel, of the true (sun) revolves round the heavens, and never (tends) to decay; seven hundred and twenty

children in pairs, Agni, abide in it. [Twelve-spoked wheel: the twelve signs of the zodiac:

dva_das'a_ram dva_das'a

san:khya_kames.a_dira_s'ya_tmakaih

ma_sa_tmakairva_araih

ratha_n:ga_vayavayairyuktam; the term may also mean twelve months; seven hundred and twenty children: nights and days; three hundred and sixty of each: **sapta ca vai s'ata_ni**

vim.s'atis'ca sam.vatsarasya_hora_tra_h sa es.ohah smma_nah

(Aitareya A_ran.yaka 3.2.1)].

1.164.12 They have termed the five-footed, twelve-formed parent, Puris.in, when in the further hemisphere of the sky; and others have termed in Arpita, when in the hither (portion of the sky); shining in his seven-wheeled car), each (wheel) having six spokes. [Puris.in: fr. puris.a, water; puris.in = the sun, as the source of rain; the first five feet are the five seasons, the dewy and cold seasons forming one; the twelve forms are the twelve months, or twelve a_dityas; arpita = adhi_nam or para_yattam, dependent upon, and applicable to the sun, as dependent upon, or influenced by, the course of the year, or recurrence of the solstices; moving quick or slow according to his southern or northern declination; in the hither portion of the sky: upare = where living creatures are delighted--uparamanta asmin pra_n.inah; or, it may mean a year, va_sam.vatsarah; it may be related to the first line of the hymn: divah pare ardhe, in the further part of the sky; upara may imply the nearer or hither part, referring to the two ayanas, or solstices; the seven wheels are the seven rays, or the seven days of the week, the six spokes are the six seasons].

1.164.13 All beings abide in this five-spoked revolving wheel; the heavily-loaded axle is never heated; its eternal compact nave is never worn away. [Five-spoked wheel: the five seasons; or the cycle of five years].

1.164.14 The even-fellied, undecaying wheel, repeatedly revolves; ten, united on the upper surface, bear (the world); the orb of the sun proceeds, invested with water, and in it are all beings deposited. [Ten: the ten organs of sense, or the five lokapa_las, guardians of the world,

and five classes of human beings; upper surface: utta_na_ya_m, or the upper part; u_rdhvatana_ya_m, or the pole, i_s.a_ya_m; or the earth spread above, upari_vistr.ta bh_myam; the orb of the sun: su_ryasya caks.us. = lit., the eye of the sun, either the display of the nature or radiance of the sun, or his orb, being, as it were, the eye of all; sarvasya caks.uh stha_ni_yam va_man.d.alam].

1.164.15 Of those that are born together, sages have called the seventh single-born; for six are twins, and are moveable, and born of the gods; their desirable (properties), placed severally in their proper abode, are various (also) in form, and revolve for (the benefit of) that which is stationary. [Six are twins: six seasons, made of two months each; the seventh is the intercalary month, which has no a_ditya to preside over it; the six seasons are also r.si, r.s.ayah = ganta_rah, goes; a r.s.i is present in the sun's car in each of the twelve months; revolve for the benefit: the seasons are diversified by classes of temperature, produce, for the benefit of the world].

1.164.16 They have called thes, my virtuous females, males; he who has eyes beholds; the blind man sees not; he who is a sage son understands this, and he who discriminates is the father of the father. [Males: an instance of grammatical mysticism: ras'mi, a ray of the sun, is here personified as a female, is properly a noun masculine; the father of the father: the sun is to be considered as the father of the rays of light, which are the cause of rain, or the fosterers or parent of the earth; the sun is, therefore, the father of the father, and he who knows this is identical with the sun].

1.164.17 The cow, holding her calf underneath with her fore-feet, and then above with her hind-feet, has risen up; whither is she gone; to whom has she turned back when half-way; where does she bear young; it is not amidst the herd. [The cow is the burnt-offering and the calf is Agni and the positions of the two indicate the station of the offerer with respect to the sun; or, the cow may typify the solar rays collectively and the calf the worshipper].

1.164.18 He who knows the protector of this (world) as the inferior associated with the superior, and the superior associated with the inferior, he is, as it were, a sage; but who in this world can expound (it); whence is the divine mind in its supremacy engendered.

1.164.19 Those which (the sages) have termed descending, they have also termed ascending; and those they have termed ascending, they have also called descending; and those (orbits) which your, Soma and Indra, have made, bear along the worldlike (oxen) yoked to a twain. [Those which: the rays of light, or the planets changing their relative position as they revolve; Soma and Indra: the moon and the sun; Indra is one of the twelve A_dityas or identical here with the sun].

1.164.20 Two birds associated together, and mutual friends, take refuge in the same tree; one of them eats the sweet fig; the other abstaining from food, merely looks on. [Two birds associated together: the vital and supreme spirit, jiva_tma_ and parama_tma_, are here alluded to using the metaphor of the two birds; eats the sweet fig: pippalam sva_du atti: the vital spirit enjoys the rewards of acts. dvau dvau ratis.t.hitau sukr.tau dharmakarta_rau: two species of souls to be intended as abiding in one body (Nirukta 14.30)].

1.164.21 Where the smooth-gliding (rays), cognizant (of their duty), distil the perpetual portion of ambrosia (water); there has the lord and steadfast protector all beings consigned me, (though) immature (in wisdom). [Smooth-gliding: supran.a =supatanah s'obhana gamana ras'mayah, the goes easily or beautifully, the rays of the sun; consigned me: A_ditya has admitted, or admits me, the reciter of the hymn, to the sphere of the sun].

1.164.22 In the tree into which the smooth-gliding (rays) feeders on the sweet (produce), enter, and again bring forth (light) over all, they have called the fruit sweet, but he partakes not of it who knows not the protector (of the universe). [The tree: the orb or region of the sun; he partakes not of it, who: tan na unna s'ad yah pitaram na veda: pitaram = pa_laka, cherisher, protector; the sun, the supreme

spirit].

1.164.23 They who know the station of Agni upon the earth; the station of Va_yu that was fabricated from the firmament; and that station of the Sun which is placed in heaven, obtain immortality. [yadga_yatre adhi ga_yatram tras.tubha_d va_ rais.tubham: perhaps, a mystical reference to the text of the Veda, a knowledge of which is essential to final felicity; ga_yatra is derived from ga_yatri_ the earth; it is the pada, or station of Agni; trais.tubha is identified with the firmament, and the place of Va_yu; ja_gat is identified with the sun: ja_gat, the solar region (Taittiri_ya Sam.hita_ 2.2.9.5-6)].

1.164.24 He constructs the prayer with the ga_yatri_ metre; with the prayer (he constructs) the Soma, and with the tris.tubh metre the couplet (or triplet); with the couplet (or triplet) he constructs the hymn with (verses of) two or four distichs; and with the syllable they construct the seven metres. [ga_yatren.a parimimi_te arkam: he, severally measures the mantra with the ga_yatri_ metre; or, a part being put for the whole, with any Vedic metre; tr.s.tubhena va_kam: va_ka signifies either dv.r.ca or tr.ca ru_pam, the form or phrase of two or three hymns; or, it may imply a su_kta; va_kena va_kam: the first va_ka is interpreted as su_kta, when repeated it implies the varga or anuva_ka; if va_ka signifies a couplet or triplet, it may be applicable to the su_kta; aks.arena sapta va_n.i_h = the seven generic metres of the Veda with the syllable, the syllable being the chief element of the metre; ga_yatri_ has eight syllables; trs.tubh has eleven syllables; jagati_ has twelve syllables. The classification of the metrical system of the Vedas is ascribed to Brahma_ or the r.s.is, the priests].

1.164.25 With the hymns in the jagati_ metre he fixed the rain in heaven, and surveyed the Sun in the rathantara. They have declared three divisions of the ga_yatri_ metre, whence it surpasses (all the rest) in force and majesty. [Fixed the rain in heaven: sindhum dvi astabha_yat: Brahma_, at the time of creation, fixed the shedder of water, udakasya syandakam, in the sky; or, a reference is to A_ditya: ja_gato

va_ es.a ya es.a tapati: he may be termed ja_gata who gives heat (to the world); rathantara: a portion of the Sa_ma; Praja_pati beheld the sun in the hymn which sustains it: tada_dha_ra bhu_ta_ya_m r.ci; ga_yatra metre: ga_yatrasya samidhas tisa a_huh: samidh signifies pada, a division of a hymn; of which ga_yatri_ metre has three].

1.164.26 I invoke the cow that is easily milked, that the handy milker may milk her; may Savita_ accept this our excellent libation, that his heat may (thereby) increase; it is for this, verily, that I earnestly invoke him. [The cow is the cloud, the milk is therein; Va_yu or win, is the milker; the metaphor is continued in the following three hymns, where the calf is the world or mankind anxious for the rain, as the cause of abundance].

1.164.27 She comes lowing, abounding in rich (products), desiring her calf in her mind; may this cow grant her milk to the As'vins; may she thrive for our great advantage.

1.164.28 The cow bellows for her calf, (who stands) with winking eyes, and lows as (she proceeds to lick his forehead; she utters a cry, as, anxious, she sees the moisture in the corners of his mouth, and nourishes him with her milk.

1.164.29 He, too, bellows, and the cow utters inarticulate sounds, as, encompassed by him, she repairs to her stall; (influenced) by her instincts, she acts like a human being, and, radiant, manifests her nature. [Life reposes: anat s'aye ji_vam ejat, life-breathing comes to repose, reposes or abides].

1.164.30 Life endowed with breath, eager (in discharge of its functions), reposes, steady, in the midst of its (proper) abodes; the life of the mortal body, cognate with the mortal frame, endures immortal (sustained) by (obsequial) offerings. [By obsequial offerings: svadha_bhiih putra kr.taih, by offerings made by the sons].

1.164.31 I have beheld the unwearied protector of the universe, the sun, travelling upwards, the downwards by various paths; invested with aggregative and diffusive radiance, he revolves in the midst of the regions.

1.164.32 He who has made (this state of things) does not comprehend it; he who has beheld it, has it also verily hidden (from him); he, whilst yet enveloped in his mother's womb, is subject to many births, and has entered upon evil. [He who has: Man; Nirukta, considers wind as the cause of rain and alludes to it allegorically].

1.164.33 The heaven is my parent and progenitor; the navel (of the earth) is my kinsman; the spacious earth is my mother. The womb (of all beings) lies between the two uplifted ladles, and in it the parent has deposited the germ (of the fruitfulness) of the daughter. [My parent: na_bhir atra bandhu: na_bhi is related to me pita_janita_, i.e. the moisture of the earth, by which corn is abundant, and which, as derived from the rain of heaven, makes the latter the parent and progenitor of man; bandhuh = bandhika_, binding or supporting; this word is an epithet of pr.thivi_, the earth; two uplifted ladles: utta_nayos' camvor yonir antar: the uplifted ladles are heaven and earth, and the womb of all beings between them is the firmament, the region of the rain; the parent has deposited: the father, the heaven, may be regarded as identical with either A_ditya or Indra; the daughter is the earth, whose fertility depends upon the rain deposited as a germ in the firmament].

1.164.34 I ask you, (institutor of the rite), what is the uttermost end of the earth; I ask you, where is the navel of the world. I ask you, what is the fecundating power of the rain-shedding steed; I ask you, what is the supreme heaven of (holy) speech. [The next hymn answers the questions].

1.164.35 This altar is the uttermost end of the earth; this sacrifice is the navel of the world; this Soma is the fecundating power of the rain-shedding steed; this Brahma_ is the supreme heavn of (holy) speech. [This altar: eta_vati_vai pr.thivi_ ya_va_ti_ vedih, such or so much, verily, as the earth, so much is the altar; it is the essence of the whole earth (Taaittiri_ya Sam.hita_ 2.6.4); the navel of the world: na_bhi = sannahana, the binding together of man with the mans of subsistence, or the crops that spring

from the rain which falls as the consequence of sacrifice or of oblations; holy speech: the texts of the Vedas, of which Brahma_, or the priest, is the author ir expounder].

1.164.36 The seven (sustaining), the embryo (rain) for half a year, the fecundating (element) of the world, abide, by appointment, in the various functions of Vis.n.u. By their intelligence they pervade in thought all around (them), for they are intelligent and diffusive. [The seven: the solar rays, sapta_rdhagarbha_h; either retaining the rains for half a year, i.e. during the dry months, or abiding in a part or half of space, or in the mid-heaven or firmament. Vis.n.u is the pervading sun; vya_pakasya A_dityasya, in whose various duties of cherishing the world, the solar rays are, by direction, pradis'a_, especially employed].

1.164.37 I distinguish not if I am this all; for I go perplexed, and bound in mind; when the first-born (perceptions) of the truth reach me, then immediately shall I obtain a portion (of the meaning) of that (sacred) word. [I distinguish not: na vija_na_mi yadiva idam asmi: this may be read as: yadi va idam, that I am like that which this is; or, if I am this; in either meaning, the philosophical implication is the identity of individual and universal spirit].

1.164.38 The immortal cognate with the mortal, affected by (desire of) enjoyment, goes to the lower or the upper (sphere); but (men beholding them) associated, going everywhere (in this world together); going everywhere (in other worlds together); have comprehended the one, but have not comprehended the other. [Affected by desire or enjoyment: svadhya_gr.bhi_tah = lit., seized by food; i.e., any sensual gratification; have comprehended the one: they have not distinguished between body and soul; or, they have not made any distinction between the three kinds of bodies with which soul is invested, the gross body, the subtle body, and the union of the two].

1.164.39 All the gods have taken their seats upon this supreme heaven, the imperishable (text) of the Veda; what will he, who knows not this, do with the Veda? but they who do know

it, they are perfect. [Upon this supreme: r.co aks.ara: parama vyomani: r.k = all the Vedas; aks.ara: yena_ks.aram purus.am veda satyam (Mun.d.aka Upanis.ad 1.2.13)].

1.164.40 Cow, may you be rich in milk through abundant fodder; that we also may be rich (in abundance); eat grass at all seasons, and, roaming (at will), drink pure water.

1.164.41 The sound (of the clouds) has been uttered, fabricating the waters, and being one-footed, two-footed, four-footed, eight-footed, nine-footed, or infinite in the highest heaven. [In the highest heaven: the sound gauri_: clouds or sky, as differently originated; in one station, ekapadi_, from the clouds; in two, dvipadi_, from the clouds and sky; in four, the four quarters of space; in eight, the four points and four intermediate points of the horizon; or from them and the zenith, navapadi_, nine-stationed; articulate speech, gauri_: single as the crude form only, double as declension and conjugation, fourfold as nouns, verbs, prepositions and particles; eightfold as the eight cases, including the vocative; and ninefold as the same, with the addition of indeclinable; articulate sound, gauri_: diversified according to the nine parts of the body whence it may be supposed to proceed, navel, chest, throat; the highest heaven is hr.dayā a_ka_s'a, ethereal element of the heart, as the basis of speech, mu_la_dha_re].

1.164.42 From her the clouds shed abundant rain, and thence (the people of) the four quarters live; thence the moisture spreads (to the grain), and the universe exists. [From her: the sound of the clouds or sky, the thunder].

1.164.43 I beheld near (me) the smoke of burning cow-dung; and by that tall-pervading mean (effect, discovered the cause (fire); the priests have the Soma ox, for such are their first duties. [The Soma ox: uks.a_n.am pr.s'nim apacanta: pr.s'ni = Soma; uks.a_n.am = the shedder or bestower of the reward of the sacrifice].

1.164.44 The three, with beautiful tresses, look down in their several seasons upon the earth; one of them, when the year is ended, shears (the ground); one, by his acts, overlooks the

universe; the course of one is visible, though not his form. [The three: Agni, who burns up the earth; the Sun, who revives it by his light, and the rain which he sends; and Va_yu, the wind, who contributes to the fall of rain].

1.164.45 Four are the definite grades of speech; those Brahman.as who are wise know them; three, deposited in secret, indicate no meaning; men speak the fourth grade of speech. [Four are: catva_ri va_kparimita_ pada_ni: the language of the mantras, the kalpa, the bra_hman.a and laukika, or current speech (Taittiri_ya Samhita_ 1.31.2); those bra_hman.as: bra_hman.a_ ye mani_s.in.ah: bra_hman.a_ = those acquainted with the s'abdabrahma, brahma as the word, or, the yogis, mystics; fourth grade of speech: va_k, speech, was created fourfold, three kinds of which are in the three regions, the fourth amongst the pas'us; the form on earth, associated with Agni is in the rathantara; the form in the firmament, associated with Va_yu, is in the Va_madevya mantras; that which is in heaven, with A_ditya, is Br.hati_, or in the thunder (stanayitnau); whatever else was more than this was placed amongst the pas'us, lit., animals; here the bra_hman.as are implied: atha pas'us.u tato ya_va_g atiricyate ta_m bra_hman.es.u adaduh; thus, the bra_hman.as speak both languages, that of the gods and that of man (tasma_d bra_hman.a_ ubharyo va_cam vadanti ya_ca deva_na_m ya_ca manus.ya_n.a(m (Nirukta 13.9)].

1.164.46 They have styled (him, the Sun), Indra, Mitra, Varun.a, Agni, and he is the celestial, well-winged Garutmat, for learned priests call one by many names as they speak of Agni, Yama, Ma_taris'van. [Hi, the Sun: Sun is assumed; Nirukta assumes the Agni: agni is all the divinities (Aitareya Bra_hman.a 2.3)].

1.164.47 The smooth-gliding wafters (of the rain, the solar rays), clothing the waters with a dark cloud, ascend to heaven; they come down again from the dwelling of the rain, and immediately the earth is moistened with water.

1.164.48 The fellies are twelve; the wheel is one; three are the axles; but who knows it?

within it are collected 360 (spokes), which are, as it were, moveable and immovable. [The wheel is the year of twelve months; the three axles are the three double seasons, or hot, wet and cold; and the three hundred and sixty spokes are the days of the lunar-solar year; stanah s'as'ayah, s'aya_na, sleeping; dehe vartama_nah, abiding in the body].

1.164.49 Sarasvati_, that retiring breast, which is the source of delight, with which you bestow all good things, which is the container of wealth, the distributor of riches, the giver of good (fortune); that (bodom) do you lay open at this season for our nourishment.

1.164.50 The gods sacrifice with sacrifice, for such are their first duties; those mighty ones assemble in heaven, where the divinities who are to be propitiated (by sacred rites) abide. [Where the divinities: yatra pu_rve sa_dhya_h santi deva_h: sa_dhya_h = karma-devah, divinities presiding over or giving effect to religious acts, yajn~a_di sa_dhanavantah; or, the term may mean those who have obtained the portion, or the condition of gods, by the former worship of Agni, or the sa_dhya_s = a_dityas, or the an:girasas, or deities presiding over the metres, chando abhima_ninah; sa_dhya_s are named among the minor divinities in Amarakos'a].

1.164.50 The uniform water passes upwards and downwards in the course of days; clouds give joy to the earth; fires rejoice the heaven.

1.164.52 I invoke for our protection the celestial, well-winged, swift-moving, majestic (Sun); who is the germ of the waters; the displayer of herbs; the cherisher of lakes replenishing the ponds with rain. [Replenishing the ponds: abhi_pato vr.s.tibhis tarpayantam, satisfying with rain the reservoirs, salila_dha_ra_n; abhi_pata = favourably, willingly, a_nuku_lyena].

Warfare in ancient times

"The earliest chariot warfare seems to have occurred in Asia Minor. Troy VI may have been established soon after 1700 BCE by chariot warriors, and there is evidence that by ca. 1650 chariots were used by the king of Hatti, by

Umman Manda at Aleppo, and by the hyksos who took over Egypt. The hyksos, an assortment of Semitic, Hurrian, and Aryan adventurers, set up at Avaris a regime known to Manetho as Egypt's Fifteenth Dynasty. As another pioneer of the new warfare, Hattusilis I not only made himself Great King of all Hatti -- a remarkable accomplishment -- but also raided as far as Aleppo and Alalakh. By 1600 chariot warriors were in control at Mycenae and elsewhere in Greece, and not long thereafter charioteers took over northwestern India. CHARIOTEERS: NUMBERS AND COSTS. Chariot forces in the middle of the seventeenth century were relatively small and possibly numbered no more than a hundred vehicles. At this time, the chariots were presumably used against infantries of the old style. As charioteers proliferated, the target of a chariot archer was increasingly the horses and crewmen of the opposing chariotry, and it became important for a king to have more chariots than his opponent had. Thutmose III's account of his victory at the Battle of Megiddo shows that by the middle of the fifteenth century BCE a great King could deploy at least a thousand chariots. At the beginning of the next century the Great Kingdom of Mitanni seems to have had at its disposal a chariotry numbering several thousand, since the Nuzi tablets indicate that one of the minor vassals of the Great King of Mitanni could all by himself have supplied his lord with over three hundred chariots. At the same time, however, an Attarissiyas (whose name has often been compared with the Achaean 'Atreus') caused trouble in western Anatolia with only a hundred chariots. Chariotries in the thirteenth century likewise ranged from a few hundred to a few thousand. At Kadesh, the Hittite king is said to have deployed thirty-five hundred chariots, twenty-five hundred of these being his own and one thousand supplied by vassals.(pp.106-107) [Robert Drews, 1993, *The End of Bronze Age: changes in warfare and the catastrophe ca. 1200 BC*, Princeton, New Jersey]

The metaphor of ratha used in RV 1.164 is expanded in RV 6.75 to enlarge into a metaphor of warfare, with particular reference to the processing of Soma. Thus, Su_kta RV 6.75 describes the chariot used in warfare:

6.075.01 When the mailed warrior advances in the front of battles, his form is like that of a cloud; with his body unwounded do you conquer; may the strength of the armours defend us. [In the front of battles: prati_kam ru_pam: Yajus. 29.58; front of the army, sena_mukham].

6.075.02 May we conquer the cattle (of the enemies) with the bow; with the bow may we be victorious in battle may we overcome our fierce-exulting (enemies) with the bow; may the bow disappoint the hope of the foe; may we subdue with the bow all (hostile) countries. [Exulting: samadah: sa, with; amda, xhilaration; or, sam, entirely; ad, who devours (Nirukta 9.17, 9.18)].

6.075.03 This bowstring, drawn tight upon the bow, and making way in battle, repeatedly approaches the ear (of the warrior), as if embracing its friend (the arrow), and proposing to say something agreeable, as a woman whispers (to her husband).

6.075.04 May the two extremities of the bow, acting in concert, like a wife sympathizing (with her husband), uphold (the warrior), as another nurses her child upon her lap; and may they, moving concurrently, and harassing the foe, scatter his enemies. [Like a wife: bibhr.ta_m = ra_ja_nam dha_rayeta_m; or, dha_rayata_m samam, support the arrow; samaneva yos.a_ (a singular used for the dual), the two extremities drawing close to the archer, like two women to their lover, stiyau yatha_ka_ntam a_gacchatah].

6.075.05 The quiver, the parent of many, of whom many are the sons, clangs as it enters into the battle; slung at the back (of the warrior), prolific (of its shafts), it overcomes all shouting hosts. [Shouting hosts: san:ka_h pr.tana_h: san:ka_ = sounding together, sam ka_yanti; Ya_ska, Nirukta 9.14: san:ka_: from sac, to be assembled or sam, with; kr., to be renowned, armies in which there are assembled, or celebrated warriors].

6.075.06 The skilful charioteer, standing in the car, derives his horses before him whatsoever he will; praise the efficacy of the reins, for the reins from the back (of the car compel the steeds) to follow the intention (of the driver).

6.075.07 The horses raising the dust with their hoofs, rushing on with the chariots, utter loud neighings, retreating not (from the charge), but trampling with their fore feet upon the enemies, they destroy them. [The horses raising: vr.s.apa_n.ayo as'vah = pa_m.suna_m vars.akakhura, with hoofs the showerers of dust; as'vava_ra = riders: vr.s.ab as'va_h haste yes.a_m te as'vava_rah; this is the nominative of kr.n.vate ghos.a_n, calling out, jaya, jaya; a_s'eva, the horses make a noise; hes.a_di s'abda_n, neighing, and the like].

6.075.08 The spoil borne off in his car, in which his weapons and armour are deposited, is the appropriate oblation of the warrior; therefore let us, exulting, daily do honour to the joy-bestowing car. [rathava_hanam: anas, a car or truck on which the car is placed].

6.075.09 The guards (of chariot), revelling in the savoury (spoil), distributors of food, protectors in calamity, armed with spears, resolute, beautifully arranged, strong in arrows, invincible, of heroic valour, robust, and conquerors of numerous hosts. [The guards of the chariot: pitarah is the only substantive: pa_layita_rah, guards, defenders, a body of spearmen, s'aktivantah: attendants on the war chariot of the chief].

6.075.10 May the bra_hman.as, the progenitors presenters of the Soma, the observers of truth, protect us; may the faultless heaven and earth be propitious to us; may Pu_s.an preserve us from misfortune, let no calumniator prevail over us. [The observers of truth: r.ta_vr.dhah raks.a_: of deities, deva, raks.atasma_n, protect us; raks.a = raks.ata].

6.075.11 The arrow puts on a (feathery) wing; the (horn of the) deer is its point; it is bound with the sinews of the cow; it alights where directed; whenever men assemble or disperse, there may the shafts fall for an advantage. [Deer is its point: mr.go asya_danta: the deer is its tooth; i.e. the horn of the deer; or, mr.ga, an adjective, that which seeks or reaches the enemy (Nirukta 9.19); with the sinews of the cow: gobhih sannaddha = govika_raih sna_yubhih, with tendons derived from the cow].

6.075.12 Straight-flying (arrow), defend us; may our bodies be stone; may Soma speak to us encouragement; may Aditi grant us success.

6.075.13 Whip, with which the skilful charioteers last their thighs and scourge their flanks, urge the horses in battles. [Skilful charioteers: pracesah, applied to as'va_n, the intelligent horses].

6.075.14 The ward of the fore-arm protecting it from the abrasion of the bow-string, surrounds the arm like a snake with its convolutions; may the brave man, experienced in the arts of war, defend a combatant on every side.

[hastaghna = a shield, as well as the guard of the fore-arm; with its convolutions: ahiriva bhogaih = s'ari_rena, with the body].

6.075.15 This praise (be offered) to the large celestial arrow, the growth of Parjanya, whose point is anointed with venom, whose blade is iron. [The growth of Parjanya: the stem of the arrow formed of the s'ara reed or grass growing in the rainy season].

6.075.16 Arrow, whetted by charms, fly when discharged; go light among the adversaries, spare not one of the enemy.

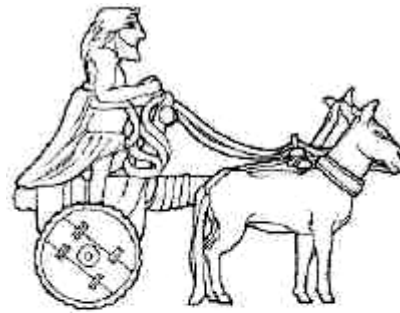
6.075.17 Where arrows alight like shaven-headed boys may brahman.aspati, may Aditi, grant us happiness every day. [Like shaven-headed boys: kuma_ra_vis'ikha_iva, like boys without the lock of hair left at shaving; mun.d.ita_mun.d.ah, shorn-headed; the arrows fall where they like, as boys before they are left with the lock of hair, before the religious tonsure, play about where they like].

6.075.18 I cover your vital parts with armour; may the royal Soma invest you with ambrosia; may Varun.a amplify your ample felicity; may the gods rejoice (at beholding you) triumphant. [May Varun.a amplify: uror vari_yo varun.as te kr.n.otu, may Varun.a make the increase of the large; that is, sukham, happiness].

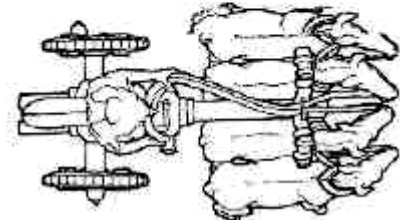
6.075.19 Whoever, whether an unfriendly relative or a stranger, desires to kill us, may all the gods destroy him; prayer is my best armour. [Sa_maveda: brahma varma mama_ntaram, s'arma varma mama_ntaram, my best happiness my armour].

Image of a chariot as depicted mainly in the R.cas

The r.cas which relate to chariots, charioteers and parts of the chariot and carts (wagons) and elucidated vivid metaphors, clearly point to the model of the Tell Agrab chariot evolved from the 4th millennium BC, with solid wheels, later modified as bi-partite or tri-partite wheels. (See also the ca. 1900 BCE Daimabad model chariot).



Copper model, Tell Agrab.
Baghdad, Iraq Museum
31389 (after Frankfort 1943, pl. 58-60).



The vehicles were drawn by oxen, and other bovine. (anad.va_h:

RV 10.59.10; 10.85.10; 3.53.18; go: RV 1.84.16; 5.56.4; vr.s.abha: RV 10.102.5; gardabha: RV 3.53.23; ra_sabha: RV 1.34.9; mules (as'vatara, as'vatari_: AiB 4.9.1)). Pu_s.an's chariot was drawn by goats (aja: RV 1.162.2; 10.26.8). Maruts' chariot was drawn by antelopes (pr.s.ati_: RV 5.55.6). Ratha was mostly drawn by horses (as'va, which may connote the equus species, in general). Dadhikra_ is a divine horse (RV 4.38-40; 7.44); other horse names are: ta_rks.ya, paidva, etas'a (pl., the sun's horses: RV 1.54.6; 8.50.9).

Ratha is generally driven by two charioteers but also was used to carry loads.

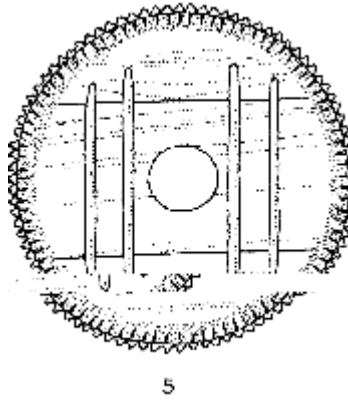
Ratham.tara is a sa_man (RV 10.181.1); rathasam.ga is a line of chariots (RV 9.53.2) ranged for the sake of wealth (acquisition). In

later centuries, **sam.grahi_tr.** (a tax-collector) is a charioteer. (Jaimini_ya Bra_hman.a 2.1037; A_pastamba S'rauta Su_tra 17.17.4; MS 4.4.6: 57.4; TB 1.7.9.5-6; S'Br. 5.4.3.23).

प्रथश् च यस्य सप्रथश् च नामानुष्टुभस्य हविषौ हविर
यत् ।

धातुर द्युतानात् सवितुश् च विष्णो रतुर्म आ जभारा
वसिष्ठः ॥

10.181.01 Vasis.t.ha, whos (son) is Pratha by name, and whose (son) is Sapratha, has (with them) borne away from Dha_ta, and from the



radiant Savita_, and from Vis.n.u, the rathantara portion of the oblation which is offered with the anus.t.up verse. [Rathantara: is the Sa_maveda; or some hymns of this Veda].

अया निजघ्निर ओजसा रथसंगे धने हिते ।

स्तवा अविभ्युषा हृदा ॥

9.053.02 (You are) by this strength the discomfited (of foes), I praise you with a fearless heart for the sake of (our) line of chariots ranged (against the foe) and for the sake of wealth.

Many parallels can be drawn from the archaeological finds of chariots of the Near East since the 4th millennium and the copper model

chariot-box found in Chanhudaro. The details shown by these glyphs can be related to the ratha-related terms contained in the R.gveda.^{iv}

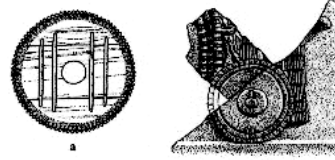


Chanhudaro; chariot box (Fig.2, Pl. LVIII, Mackay, Chanhudaro Excavations)

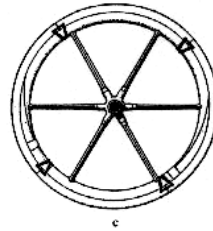
Detail of stone plaque depicting a ratha, Ur. Philadelphia, University Museum CBS 17086 (after Woolley 1934,

pl.181: b)

The use of the term, '**ara_**' in R.gveda is interpreted in lexicons as 'spokes'. It would appear that the early solid wheel did not have spokes and had three planks which were firmly anchored



together using two or four 'joiners'. It is possible that these joiners were referred to as '**ara_**'.



For example, the phrase in RV 1.32.15, **ara_n na nemih parita babhu_va** can be translated

Figure 1. Wheel types. (a) reconstruction of a wheel type from graves in Kish, Ur, and Susa, mid-third millennium BCE; (b) depiction of a wheel on a stele of Gudea, late third millennium BCE; (c) drawing of a six-spoked wheel surviving from eighteenth-dynasty Egypt. (After Littauer and Crowell, 1979)

'as the

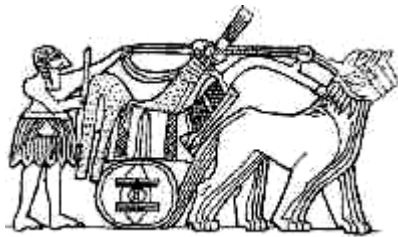


3

circumference is held together by the joiners of the wheel.'

Wheel, Susa (after de Mecquenem 1943, fig. 89: 1-2 and Pl. X:2; cf. M.A. Littauer and J.H. Crouwel, 1979, *Wheeled Vehicles and Ridden Animals in the Ancient Near East*, Leidenj, E.J. Brill)

Detail of 'Standard' of Ur. London, BM 121201 (after Strommenger and Hirmer, M., 1964,



Five Thousand Years of the Art of Mesopotamia, New York, Stronach D, pl. XI). Note the crossed struts at each end of the box, comparable to the design on Harappan and Chanhudaro chariot box. This 'standard re-inforcing design' of a chariot-box is repeated in other Mesopotamian pictorials. See figs. 13, 14, 20, 24, 57, 81, 83, many of which are described as 'battle cars' (M.A. Littauer and J.H. Crouwel, 1979, *Wheeled Vehicles and Ridden Animals in the Ancient Near East*, Leidenj, E.J. Brill, pp. 181-184) or 'rathas' in the semant. of the R.gveda. The Mesopotamian parallels show that a 'ratha' as a battle car could also have solid-, bipartite, or tri-partite wheels. The later designs of wheels have spokes varying in number from 4 to 12.

Based on a review of the references to ratha in the R.gveda, it can be demonstrated that the ratha of the R.gvedic times had tripartite solid-wheels. In RV 1.164.48 which is an astronomical metaphor of circular (non-linear) time, the term, **tri_n.i nabhya_ni** is interpreted as 'three axles'; this could as well mean: 'three parts of the (solid) wheel'.

Ratha, and the spoked-wheel metaphor in the R.gveda Su_kta: 1.164

The 'chariot' and the 'charioteer' (ratham, rathih, sa_rathih--RV 1.158.06) are recurrent themes in the R.gveda. The chariot is distinguished from a wagon, 'ratha' and 'anas, s'akat.a' respectively (RV 3.033.09); a few r.cas from Man.d.ala 1 and 3 may be cited; Maruts have deer yoked to their chariots (RV 1.085.05) and As'vins have 'donkeys' harnessed to their chariots (RV 1.116.02). The use of the term 'ra_sabhas'vinoh' is significant; ra_sabha was also categorised as an as'va, an equus, a clear indication that the donkeys, onagers and horses (all part of the genus as'va, equus) were yoked to the chariots in R.gvedic times. The use of the word 'as'va' should not automatically lead one to assume that equus caballus is implied by the word.

Could the word 'ana_sa' often contrasted and seen to be in conflict with the devas refer to those using 'anas', cart or wagon as distinct from those using 'ratha', chariot?

There is a reference to the makers of chariots, bhr.gava_h, explained as di_ptas taks.a_n.ah, dexterous carpenters:^v

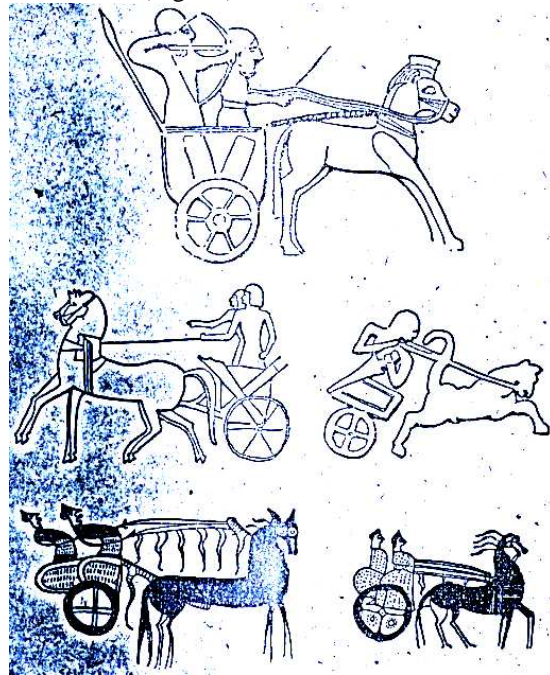
"The fact that Aryan warfare was based on the use of swift, horse-drawn battle-chariots, carrying a warrior armed with a bow and driven by a charioteer, is in itself of very great archaeological importance. Later we shall see that the Rigveda descriptions are so detailed that we can form a very good idea of the construction and to a large extent of the appearance of the chariots of the Aryan invaders of India in the middle of the second millennium BC; the chariot suits itself to the metaphors of Oriental religions, and such familiar lines as 'His chariots of wrath, the deep thunder-clouds form' might come from the Rigveda itself. The Harappa civilization, while fully cognizant of wheeled vehicles, does not seem to have made use of them in warfare-- indeed, as we have seen, evidence for any military organization for defence or offence within the Harappa empire is strangely lacking -- and the Aryan chariots clearly owe nothing to native Indian traditions. They appear as startling innovations, and to trace their ancestry we must look to the west.

"Some scholars have claimed that in Western Asia the earliest representations of a wheeled vehicle, that might be a form of chariot, is depicted on a Tell Halaf painted pot, where a human figure stands by a circular object divided by cross-lines in such a manner as to suggest an eight-spoked wheel. If this interpretation is correct, it implies that the accomplished carpentry and wheelwright's craft necessary to produce such a wheel had been evolved on the Khabur River at an extremely early date, which is surely unlikely. The production of a spoked wheel demands good metal tools of a standard certainly not attained by the hesitant, experimental metallurgy of Tell Halaf times, and I find it difficult to accept this representation as that of a wheeled vehicle at all.

"But by the beginnings of Early Dynastic times in Sumer we are on firm ground. 'Scarlet Ware' vessels of ED I date show light two-wheeled chariots with high fronts carrying one or two people and drawn either by asses or by oxen; the wheels are represented (very schematically) as solid. And in the slightly later Early Dynastic reliefs from Ur and Kafajah, and on the famous inlaid 'Standard' from the Royal Tombs of Ur, similar ass-drawn chariots are shown in great detail, with solid wheels made of two half-discs dowelled together against the hub. (On the 'Standard' the chariots at first sight appear to be four-wheeled, but, as Sidney Smith has pointed out, this is the result of a curious Picasso-like technique of representing frontal and lateral views of the same object in one convention!) Though these chariots doubtless creaked and rumbled on their clumsy wheels, yet when the pair of asses was at full speed, as in the final scenes on the 'Standard', they must have been a notable added terror to the enemies of Sumer when first encountered.

"Early in the second millennium similar chariots were in use in Asia Minor, but with two important modifications: they have light, spoked wheels and are drawn by a pair of horses. Such chariots also make their first appearance in the Aegean countries, significantly associated with Indo-European speakers, soon after this time: in Mainland Greece before 1500 (to survive, of course, to the Homeric period) and in Crete about 1450 BCE. A century or so later there is some

evidence to suggest that young Achaean princes were on occasion sent to the Hittite capital to be trained in chariotry. In Egypt the earliest representation of such a chariot is of the time of Amenhotep I, about 1550, at the beginning of the campaigns of the Eighteenth Dynasty rulers against the Levant, whence chariot-warfare seems to have been introduced into the Egyptian army. By the end of the fifteenth century BCE chariots were being exported to Egypt by the Mitanni themselves. (Fig. 31).



[After Fig. 31, Piggott, 1950: Representations of chariots, 15th to 13th centuries BC, from Sincirli, Egypt, Mycenae and Cyprus]

"In Central and Northern Europe the appearance of the chariot among the Indo-European Celts is not attested before the fifth century BC, in the Middle Rhine and the Marne (ultimately presumably derived from Western Asia), and thereafter we have considerable evidence from its structural features, which confirm its general relationship with the earlier series from the Orient now under discussion...

"It looks, therefore, as if the battle-car was an invention of Early Dynastic Sumer and that its use was adopted, with other technological devices,

such as metallurgy and the shaft-hole axe (and probably the heptatonic scale in instrumental music), by the Indo-Europeans on the northerly fringes of the kingdom of Sumer and Akkad soon after 2000 BC, given added speed and lightness by the use of horses and the invention of the spoked wheel, and spread by them in their expansion to east and west. It remained, of course, an essential weapon of the armies of Babylonia and Assyria until well into the first millennium BC, as a vehicle to carry a bowman.

"The Aryan chariot, as it appears in the Rigveda, has a name (ratha) which is an Indo-European 'wheel' word, represented by the Latin *rota*, Celtic *roth*, Old High German *rad*, and Lithuanian *ratas*, and similarly common to the whole language group are the words for wheel, axle, nave, and yoke. The body of the chariot is denoted by a word which is also used for a bucket (*kos'a*), and implies a more or less closed vehicle, unlike the Celtic Iron Age version, open back and front, but agreeing with the Western Asiatic, Mycenaean, and Egyptian chariots, which (as Sir Cyril Fox has remarked) are all built on the principle of a modern milk-float. The material of which this body was built is unknown, but by analogy it is likely to have been of wicker-work (Aegean and Celtic chariots), or perhaps leather (as in Egypt) on a light wooden framework.

"To the wooden floor of the chariot was attached the axle, apparently by leather straps: it would project free of the chariot body on each side and carried the wheels, secured by lynch-pins on their outer faces -- their stability against the fast-spinning wheel is made use of in effective metaphor. On analogy, again, one would expect this axle to be fixed centrally to the chariot floor, as in those of Mycenaean and in the earlier (fourteenth century) reliefs from Malaya in Asia Minor (and, incidentally, in Iron Age Europe); later Assyrian coach-builders' practice moved the axle to the back of the body. The use of lynch-pins is common to the Celtic and the Egyptian chariots and is likely to have been universal, providing as it does a flexible mode of attachment giving stability over rough country, which ensured its retention in English farm carts up to the present time.

"The wheels of the Aryan chariot have spokes, though the number is nowhere mentioned. There seems to have been a tendency to increase the number from four (Mycenaean, Egyptian, early Hittite examples) to six or eight (Homeric chariots have eight spokes; Celtic examples with from four to ten or twelve are known; so, too, later Hittite and Assyrian vehicles with six or eight). The importance of the hole of the nave-hub being 'sweetly-running' on the axle was recognized and is mentioned. An extremely interesting point with regard to the construction of the wheels, however, is the reference to the felloe being bent into shape:

I bend with song, as bends a wright his felloe of solid wood (7.32).

runs the simile, and this must surely imply that the felloe was single-piece, and bent into the chariot shape, just as the Celtic chariot-wheels were made. The Egyptian chariot-wheels and probably (to judge by the representations) the Mycenaean examples were not made thus, nor do the later Hittite or Assyrian reliefs suggest this primitive, but extremely strong and light, form of wheel-contraption. It presumably needs a fairly large number of spokes to make it function effectively, and might be a pointer to the Aryan wheels having more than four. Its occurrence in the two peripheral areas of Indo-European culture, so remote in time and space, is fascinating, and it still survives in Turkestan. The wheels were shod with metal tyres, as were the Homeric chariots and those of the Iron Age Celts just mentioned.

"The horses were harnessed to a single central pole, which, on analogy with known representations, probably rose in a curve from the bottom of the chariot and then continued straight, to meet the yoke almost horizontally. This use of a yoke, a form of harness appropriate to oxen but very unsuitable to a horse (with it, as Contenau put it, 'the capacity of the horse's effort is only equal to its resistance to strangulation!') is, however, characteristic of the whole ancient world, and the beginnings of the modern type of harnessing and horse-collar is not seen until Roman Imperial times in Europe at the earliest. The yoke is used universally with the chariot, whether in Eighteenth Dynasty Egypt or in Celtic Britain of the first century BC, and from the

Rigveda descriptions we can see that in all respects its fastening to the pole is equally typical of Indo-European practice. The problem was to provide a strong yet slightly flexible junction between pole and yoke, to allow for unequal stress whether the animals were pulling or checking, and this was done by providing a stout pin or bolt through the chariot-pole near its far end, against which the wooden yoke was lashed with thongs –

As with the leather thong they bind the chariot yoke to hold it fast (10.60)
and (crossing a river)
So let your wave bear up the pins, and ye, O Waters, spare the thongs (3.33)

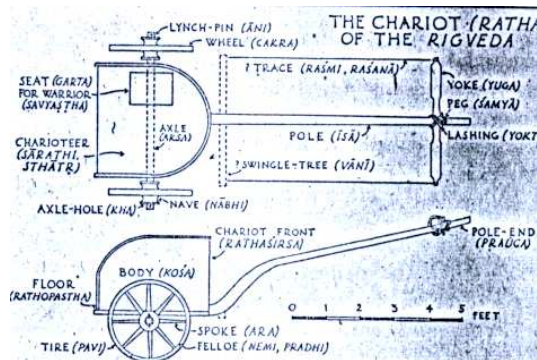
as the verses run. It recalls the extant Egyptian example and the description of the yoking of Priam's waggon in the Iliad-- 'The yoke they set firmly on the polished pole, on the rest at the end thereof, and slipped the ring over the upright pin, which with three turns of the strap they lashed to the knob, and then belayed it close round the pole, and turned the tongue thereunder'.

"There is some evidence for the use of traces on the outer sides, and one word (va_ni_) might have

the significance of a swingle-tree or splinter-bar to which these were fastened. Two horses were usually employed, but an additional one or two animals could on occasion be harnessed outside -- one is seen, indeed, in such a position on one of the 'Scarlet Ware' scenes mentioned above from Sumer, and the practice was also known in Homeric times.

"The chariot held two people, the warrior and his driver. The warrior was on the left, and seems to have been provided with a seat, which he could use at least when he was not actively engaged in warfare. His weapon was a bow and sometimes a spear, but he did not use a sword, at least at the time of the first Aryan advent in India, though a word used for 'knife' in the Rigveda takes on the significance of a weapon which might be a sword or a dagger in the Atharvaveda and the Epics. The charioteer had no seat provided -- one of his titles, stha_tr, he who stands, emphasizes the distinction between him and the bowman, but his calling was one of honour, and he might be the noble warrior's kinsman, as in Homeric Greece and Iron Age Ireland.

"The dimensions of certain parts of the chariot are given in a rather late text, the S'ulba Su_tra, in terms of anguli, or 'finger's-breadths'. The lengths given are for the pole, the axle, and the yoke, and if these are calculated on the assumption that 16 anguli equalled 1 foot (the value commonly assumed for the angula) it produces a pole nearly 12 feet long, an axle of some 6 feet 6 inches, and



a yoke of 5 feet 4 inches, all of which seem strangely large. Now it is possible to estimate certain dimensions of ancient West Asiatic chariots fairly accurately from a large number of representations, and the pole length, constantly seen in profile, is always somewhere between 6 and 7 feet 6 inches long. This agrees with the extant Egyptian chariots (6 feet) and those of Iron Age Europe (6 feet 6 inches to 7 feet). If we adopt a value for the angula of 1/2 inch, we obtain a pole length of about 7 feet 10 inches, and since a word (prauga) exists which suggest that the Aryan pole had a significant projection forward of the yoke, this would be very reasonable. Our confidence in it is increased when we calculate the other dimensions on this value, and arrive at an axle-length of about 4 feet 6 inches, and a yoke-width of about 3 feet 6 inches. It is true that the Egyptian chariot has a wide wheel-base of 6 feet 5 inches, but the European Iron Age vehicles had what is today the 'standard' gauge of carts in Britain, 4 feet 6 inches to 4 feet 8 inches, and one known in the Mediterranean at least in the first millennium BCE. Yoke-widths (one Egyptian, two European Iron Age) vary between 2 feet 8 1/2 inches and 3 feet 10 1/2 inches, so one feels strongly that the S'ulba-su_tra measurements are in the correct ratio, and that they must be interpreted on the assumption that, for this purpose at least, the angula has a value of about

1/2 inch, and that the Aryan chariot had the same proportions as those known from material evidence.

"The wheel diameter, not given in the Sanskrit text cited, is on analogy likely to have been from 2 feet 6 inches to 3 feet, and the body of the chariot would have been a similar amount above the axle. Przewalski's horse is a small animal, not more than 12 to 13 hands high, and the extant representations show similarly small horses drawing the Western Asian chariots. In Europe the Iron Age horses were as small as 11 1/2 hands at the withers (3 feet 10 inches). These conclusions are embodied in a drawing (Fig. 32) of the likely appearance of the Aryan war-chariot of the middle of the second millennium BCE.

[After Fig. 32, Piggott, 1950]

"The sum of our enquiries, therefore, is as follows. It has proved possible, by a correlation of the Vedic texts with the evidence of archaeology, to show that the war-chariot of the Aryans in India was essentially the same vehicle as that known from other areas of Indo-European colonization, whether in Mycenaean and Homeric Greece or in Celtic Britain. The chariots from Iron Age Europe and Britain have a slight but significant modification in the open body, which was otherwise built on a U-shaped plan, but in all other features the resemblance is extremely close and often (as in the single-piece felloe, the yoke and its fastening, and perhaps the wheel-base) identical in the two peripheral areas of Britain and India. Coach-builders' and wheelwrights' practice over the whole intervening area seems to have been substantially the same over a period of something a thousand years."

"Chariot warfare in Aryan India shared with that of most of the Orient the use of the bow as the essential weapon of attack; in Homeric Greece the spear and in Iron Age Europe the long sword became the chosen weapons of the warrior. We know from the Rigveda that the bow was kept relaxed until needed, and then strung; the bow-string was a cow-hide thong and it was pulled back to the ear (not, as in Homeric Greece, to the breast). The arrows were tipped with metal, and may have been barbed, and the left wrist was

protected from the recoil of the bow-string by a wrist-guard or bracer. But we cannot find decisive evidence of the type of bow -- whether in fact it was simple or composite.

"The distribution of bow-types among modern primitives and what we know of its early history suggest that there are two main families -- simple bows of wood with a mainly African centre of distribution and perhaps origin, and composite bows in which horn and sinew are used to build up a shorter, stiffer bow, which is known on the steppes and Siberia, in Turkey, Persia, and India, and among the North American Eskimo...

"Representations in Assyria of first millennium date show that bowmen in chariots used a composite bow: its shorter form would be an advantage over the longer simple bow. It is on the whole likely that composite bows of horn and sinew were invented in the Asiatic steppe and may have formed part of the early Indo-European armoury. Such bows may, in fact, have been used by the Aryans in India. Whatever the type, it was a well-loved weapon, with the twang of the bow-string sounding in the warrior's ear like a woman's endearments --

With Bow let us win kine, with Bow in battle,
with
Bow be victory in our hot encounters,
The Bow brings grief and sorrow to the foeman:
armed
with the Bow may we subdue all regions.
Close to his ear, as fain to speak, she presses,
holding
her well-loved friend in her embraces.
Strained on the bow, she whispers like a woman --
this Bow-string that preserves us in the combat
(6.75)

[Stuart Piggott, 1950, *Prehistoric India to 1000 BC*, Middlesex, Penguin Books, pp. 273-283].

'...[Rigveda's] kaleidoscopic poetry speaks of war-chariots pulled by different animals on different occasions. Thus the Dawn-goddess's 'flaming chariot of lights' (5,79,2) is connected not only with the 'tramp of steeds'. It is connected also with cows. The Rishi exclaims (5,80,2-3): 'How large is her chariot...! This is

she who yokes her cows of rosy light.' The second of the phrases occurs again in another hymn (1,124,11): 'she yokes her host of the ruddy cows', *yun:kte ga_va_m arun.a_na_m ani_kam*. The Rigveda employs too the word *aja*, meaning 'goat', as a chariot-pulling animal. The God Pushan, the Increaser, is given a chariot whose yoke the goats take upon them (1,138,4). At one place, in a flight of vision, we get even birds: a hymn (4,45,4) makes the horses of the chariots of the Asvins, the *Na_satya_s*, change into birds. So to approach the Rigveda archaeologically we need first a general pointer to a war-chariot drawn by any animal in pre-Harappan times. (K.D. Sethna, 1992, *The Problems of Aryan Origins: From an Indian Point of View*, Second Extensively enlarged edition with five supplements, Delhi, Aditya Prakashan, p. 251).

"About the writing on the Harappa_n stamp-seals, Walter Fairervis Jr., remarks: "It appears to be hieroglyphic or ideographic in form. Human, animal and floral figurines are readily recognizable, multiple dashes probably represent numbers, while such objects as wheels, bows and arrows, and trees very likely represent themselves -- it would seem that they are not phonetic symbols." (1958, 'The Ancient East, *Natural History*, November 1958, New York, pp. 506-7). Now, if we look at the wheels in the illustrations provided by Fairervis we find them clearly with six spokes. (ibid., p. 505; See the plate we have reproduced, showing two seals. The present writer argued for spoked chariot-wheels as far back as 1963 in the same article in which he made out a case for the domesticated horse: 'The Aryans, the Domesticated Horse and the Spoked Chariot-wheel', 1963, *Journal of the Asiatic Society of Bombay*, Bhau Daji Special Volume, Vol. 38, pp. 44-68)...

"The wheels are fairly frequent in Harappa itself (e.g. Seals Nos. 2029, 2119, 2160, 3309). They occur on as many as nine seals recovered from a part (DK area) of the lower city of Mohenjo-daro. (E.J.H. Mackay, Further

Excavations at Mohenjo-daro, New Delhi, 1937, Vol. II, Pls. LXXXIII and LXXXIV). They are seen on three seals from Kalibangan. (B.B.Lal, *Has the Indus Script been deciphered? An assessment of two latest claims*, Paper read at the 26th International Congress of Orientalists, Paris, 16-22 July, p. 8). They are still more frequent on weapons than on seals. (Mackay, opcit, Pl. CXXVI, and MS Vats, Excavations at Harappa_, Delhi, 1941, Pl. CXXIII). Kalibangan has yielded also two potsherds inscribed with them. (Lal, op:cit, p. 8). And now from Surkotada comes not only a seal from the lowest layer with a six-spoked wheel traced on it (JP Joshi, Exploration in Kutch and Excavation at Surkotada and new light on Harappan Migration, in: *Journal of the Oriental Institute*, Vol. XII, Nos. 1-2, MS University, Baroda, Sept.-Dec. 1972, Pl. VII facing p. 121), but also a pottery fragment painted with the same sign (Sankalia, H.D., 1974, *Prehistory and Protohistory of India and Pakistan*, Poona, Deccan College, p. 363, fig. 95)...

"Pusalker, referring to the Harappa_n wheel-sign, says that, like the swastika, it is a symbol of the sun. ('The Indus Valley Civilization, in RC Majumdar and AD Pusalker eds., *The Vedic Age*, London, Allen and Unwin, 1952, p. 189). Doubtless, in antiquity the circle was a sun-symbol: thus the Egyptian hieroglyphs had a circle, with a circlet within it, as a solar emblem whose sound-value was Ra or Re. (PE Cleator, 1959, *Lost Languages*, Mentor, New York, p. 51). But nowhere in the world either before 2500 BCE or in the early Harappa_n period -- do we have in any writing except of the Indus Valley Civilization the sign of the circle with inner spokes. Outside the Indus Valley the earliest such sign is in the Mycenaean syllabary as set forth by Michael Ventris and John Chadwick, the now-famous Linear B. script. (ibid., p. 155, Fig. 11). There is a four-spoked circle, denoting the ka-sound. The language is Indo-European, an archaic Greek spoken in the 14th century BCE when people were already acquainted with the spoked chariot-wheel. And

it is here we get a confirmation of our thesis that in c. 2500 BCE the Harappa_n spoked-wheel sign points to a chariot like those that came into vogue in Asia Minor about 1700 BCE. For, in the first place, the Linear B script has many ideograms and some of them 'are clearly pictorial (as in the case of Men, Tripods, Chariots)' (ibid., p. 156). The pictorial ideogram of the chariot shows a four-spoked wheel. (ibid., p. 157, Fig. 12, col.4, 2nd and 3rd ideograms from below). In the second place, even outside the script, we have representations of chariots ridden by Mycenaean warriors, and again we are faced with the same wheel. (Stuart Piggott, 1951, *Prehistoric India*, Penguin, Harmondsworth, p. 275, Fig. 13, 3rd picture). There is perfect justification for us to argue from the Harappa_n wheel-sign to a Harappa_n chariot running on wheels with six spokes.

"Actually it seems we do not have to wait on a proof from Mycenae. Our spoked wheels do not invariably occur in isolated suggestiveness: they are also found in association with a sign that should make it perfectly evident that these representations are the wheels of a chariot. We get a most enlightening observation from the Finnish scholars who have tried to read Proto-Dravidian in the Indus script, but, like everyone else attempting decipherment so far, unsuccessfully, as may be gathered from the penetrating criticism of BB Lal and other savants, who have basically invalidated their linguistic assumptions, arguments and methods. They bring into prominence Seal No. 3357 where a man's figure shown standing with one foot on one spoked wheel and the other on a similar circle. (GR Hunter, 1934, *The script of Harappa_ and Mohenjo-da_ro*, London, Kegan Paul, Pl. XXXII, No. H 106). Apropos of the attachment of the two wheels to the feet of the man and not to his hands, as in the case of bow-and-arrow signs, the scholars declare that this fact makes it clear that the spoked-wheel sign depicts: 'a (cart-)wheel'. They add: 'We have made this identification while realising full well that the spoked-wheeled war chariot was a later invention of the Aryans.' (Asko Parpola, Seppo

Koskenniemi, Simi Parpola, Pentti Aalto, 1969, Decipherment of the Proto-Dravidian Inscriptions of the Indus Civilization, The Scandinavian Institute of Asian Studies, Special Publication No. 1, Copenhagen, p. 24).




Sign

42



h212a

and b (P)  Inscription 4357 (M); (P) Parpola Pictorial Corpus; (M) Mahadevan Concordance

"If the decipherers had not been obsessed with the notion that Aryanism in India was post-Harappa_n, they would have drawn the correct conclusion that a Seal like No. 3357 proves the war-chariot with spoked wheels to be an earlier invention of the Aryans, and the Harappa_ Culture to be their inheritor in spite of whatever Dravidianism it may have developed. To propose, as the Finnish scholars do in their second publication (1969, pp. 6, 20-21, 42-43), that the wheels are those of a potter using both his legs to turn them is surely an excessive flight of imagination. Besides, it does not do away with their spoked aspect. This aspect is indeed the central point, and its application to a chariot-wheel is the most natural, especially in a sign-arrangement like the one before us...

"S.R.Rao remarks in connection with an important Harappa_n site in Saura_shtra: 'Relevant to the subject of chariots is the graffito on the potsherd from Lothal wherein a figure is seen standing on two wheels resembling the Assyrian chariot-drivers painted on pottery. Attention may be drawn here to the fact that hubbed terracotta wheels painted in red with diagonal lines suggesting spokes are also encountered at Lothal.' (S.R.Rao, 1973, Lothal and the Indian Civilization, Asia, Bombay, p.124). We may remind ourselves that 'the Assyrian chariot-drivers' hail from a period when spoked wheels were a common property.

"...in ancient times, solid wheels were made in two ways. A couple of half-discs were dowelled

together against the hub (Piggott, opcit, p. 274), in which case there no visible supports. Or else the wheels 'were made with two or three segments fastened with transverse struts and strengthened with a swelling around the hub.' (*Encyclopaedia Britannica*, 1974, Vol. 19, p. 520, col.2)....Egyptian, late Hittite and Assyrian examples have even the same number of spokes (Piggott, opcit, p.275, Fig. 31, picture 2; p. 277) as on the Harappa_n seals, weapons and potsherds..

"To the doubt whether the Harappa_ Culture had sufficiently sophisticated metal tools for the manufacture of the spoked wheel, the answer is unequivocal. The impression of primitiveness produced by some Harappa_n weapons needs to be emphatically qualified. A.L. Basham writes: 'In one respect the Harappa_ people were technically in advance of their contemporaries - they had devised a saw with undulating teeth, which allowed the dust to escape freely from the cut, and much simplified the carpenter's task. From this we may assume that they had particular skill in carpentry'. (A.L. Basham, 1961, *The Wonder that was India*, New York, Grove Press Inc., p. 21). Then there is the twisted copper or bronze drill discovered by Rao at Lothal. Sankalia records the find and comments: 'Its occurrence at so early a date is of great moment in the history of civilization.' (Sankalia, H.D., 1962, *Indian Archaeology Today*, Asia, Bombay, p. 61)...

"This point about the state of metallurgy is important, as it keeps the Harappa_n wheel-representation distinct from a certain solitary exception, which is still earlier, tentatively dated to about 4000 BCE. Piggott has discussed the Tell Halaf painted pot where a human figure stands by a circular object divided by cross-lines. Piggott finds it difficult to accept the representation as that of a wheeled vehicle because the metallurgy of Tell Halaf times is known to have been hesitant and experimental, not at all equipped with tools of a standard demanded for the production of a spoked wheel. (*Prehistoric India*, p. 200). Besides,

there is no supporting evidence for any sort of wheeled vehicle in c. 4000 BCE. According to Gordon Childe, the earliest vehicles in history, date to a little before 3500 BCE. (Gordon Childe, 1951, 'The First Wagons and Carts from the Tigris to the Severn', *Proceedings of the Prehistoric Society*, 17(3), pp. 177-94). And they are without the least trace of spokes. Even as late as the Royal Tombs of Ur (c. 2500 BC) the Mesopotamian wheels are solid...

"And when we learn from Macdonell and Keith that in the Rigvedic chariot 'sometimes a solid wheel was used' (*The Vedic Index*, II, p. 201), we get a link between India's oldest scripture and the clay-model carts and chariots of the Indus Valley Civilization, in addition to a link between it and that civilization's wheel-figures on stamp-seals, weapons and potsherds. Thus a Rigveda prior to 2500 BCE can account for all we know of Harappa_n wheels...

"Spokes were adopted at different times by different peoples and countries. O. Schrader has expressly pointed out agreement in the names of the following portions of the wagon in the Indo-European languages: wheel, axle, nave, lynch-pin, pole and yoke. The agreement is set over against the near-disagreement about the felloe (the outer rim attached to the spokes) and the total disagreement about the spokes. (1890, *Prehistoric Antiquities of the Aryan People*, translated by Frank Byron Jevons, London, Charles Griffin and Co.; 1972, repr. Oxford Publishers, Delhi, p. 339). Schrader, referring to the terms in common, notes: 'In this collection, it will be observed, there is no equation for the spoke of the wheel'. Thus it is not unnatural for both the Rigveda and Harappa_ Culture to have the spoked wheel exclusively in their respective epochs -- with nothing like it in the rest of the world.

"Not only is it unnecessary to date the Rigveda after the Harappa_ Culture in the context of the wheel with spokes. It is also more in the fitness of things to regard it as pre-Harappa_n in that context." (K.D. Sethna, 1992, *The Problems of*

Aryan Origins: From an Indian Point of View, Second Extensively enlarged edition with five supplements, Delhi, Aditya Prakashan, pp. 48-55)

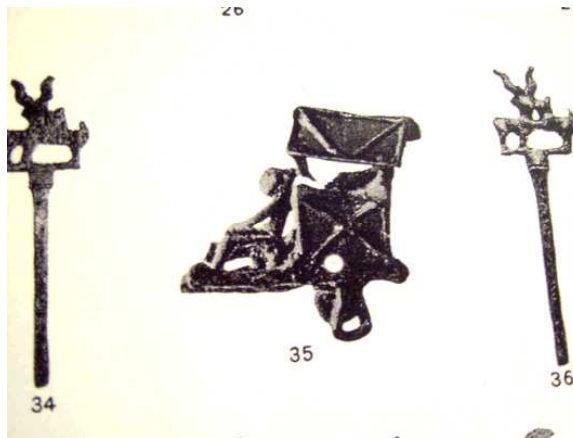
As'va, horse or onager?

It should also be noted that 'as'va' is a generic term for equus species and can as well be interpreted to connote an onager.

Historical evolution (from 4th millennium BC) of the 'ratha' or chariot in Indian Civilization and in vivid contact areas in Mesopotamian Civilization and the Ancient Near East

The Harappan chariot (Vats) is comparable to the Chanhudaro model (Mackay: see Pl.LVIII,2) which is comparable to the Mesopotamian model depicted on the stone plaque. (Littauer and Crouwel, fig.3 -- Actual artefacts of comparable (though not exact) types were found at Kish, Ur and Susa in Elam; I will post these, Sumerian pictograms and more for ready reference).

I disagree with Marshall that the Harappan find (fig. 35) could have been an ekka_ (MIC, vol. I, p.39) ; it is more like a chariot-box of a 'battle car', with bottom rings intended for the axle to pass through.



Harappa chariot-box (Fig. 35, Pl. CXXV, Vats, *Excavations at Harappa*)

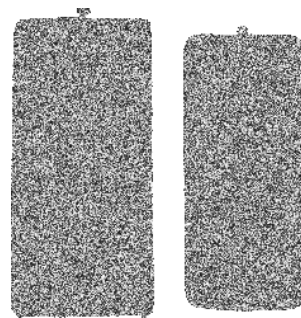
Detail of 'Standard' of Ur. London, BM 121201 (after Strommenger and Hirmer, M., 1964, *Five Thousand Years of the Art of Mesopotamia*, New York, Stronach D, pl. XI). Note the crossed struts at each end of the box, comparable to the design on Harappan and Chanhudaro chariot box. This 'standard reinforcing design' of a chariot-box is repeated in other Mesopotamian pictorials. See figs. 13, 14,

20, 24, 57, 81, 83, many of which are described as 'battle cars' (M.A. Littauer and J.H. Crouwel, 1979, *Wheeled Vehicles and Ridden Animals in the Ancient Near East*, Leidenj, E.J. Brill, pp. 181-184) or 'rathas' in the semant. of the R.gveda. The Mesopotamian parallels show that a 'ratha' as a battle car could also have solid-, bipartite, or tri-partite wheels. The later designs of wheels have spokes varying in number from 4 to 12.

The 'light-weight' vehicles are a development in the 2nd millennium (see the chariot types of Egypt depicted in the following table). The term 'ratha va_hana' is variously interpreted. It is explained as a movable stand to hold chariot (AV 3.17.3) Vedic Index notes Roth's opinion this is where the chariot rested when not in use (loc.cit. Frestgruss on Bohtlingh, 95). Two horses which draw the stand is referred to as rathava_hana (MS 2.2.1). Sa_yan.a, however, equates it to an anas, explained as a cart or wagon.

The box has a high front and is reinforced by diagonally crossed struts. The Mesopotamian example is like a battle-car and used in the military warfare context. This will certainly match with the R.gvedic metaphor on warfare.

Surprise! The bipartite, tripartite and solid wheels also had tyres! (ne_mi or pavi are the words used in the R.gveda to describe tyres). This will be elucidated from the examples found in Mesopotamia in a contemporary period (3rd millennium BC).



Pavis, pavoise, pavas, pavise, pavais, pavacke, tallevas, talvas, taloche. Note the **spoked wheel** on the second pavis from left. Both German, about 1400 CE.

Metropolitan Museum. "A large shield of the

15th cent. And later, used as a protection for archers and cross-bowmen at sieges. It was large enough to cover two men completely; the lower end rested on the ground and upper was supported by a prop or an attendant. (Grose II, 257). **Paviser**. One who carried and supported a pavis for an archer. This was a position of responsibility and danger, and men were regularly employed for this purpose." [GC Stone, Fig. 617, p. 491].

Carts of the Ancient Near East

"Wheeled vehicles apparently developed in Sumer during the Uruk period, perhaps as early as 3000 BCE. The earliest type was a heavy, four-wheeled, ox-drawn wagon featuring a boxlike body and four solid wheels. Excavated remains reveal that these early wagons were relatively small, with bodies less than half a meter wide and wheels 50-100 cm in diameter. Covered wagons, with leather or linen covers, are represented in Sumerian models as early as 2500 BCE, as well as at Carchemish and Assur. Examples of some of the earliest remains and models of various types of wagons and carts are presented by Armas Salonen in his *Die Landfahrzeuge des alten Mesopotamien* (Helsinki, 1951, pp. 157-158). From this cumbersome wagon developed the somewhat lighter two-wheeled cart, which was still a ponderous affair, also borne on solid wheels...The Akkadian term for wagon, **eriquu**, occurs frequently in Mesopotamian literature and in records from the earliest times through the Neo-Babylonian period (626-539 BCE)...A closed, four-wheeled, covered wagon is depicted on Ashurnasirpal's obelisk...Carts and wagons were used especially to transport heavy loads, such as large quantities of metal, timber, or military supplies (see Annals of Sennacherib 1.25). After the introduction of the horse as a draft animal in about 2300 BCE, a lighter type of two-wheeled cart was needed. This lighter vehicle, the precursor to the chariot, eventually evolved, thanks to a new technological development: by about 1500 BCE, Mesopotamian craftsmen had learned the

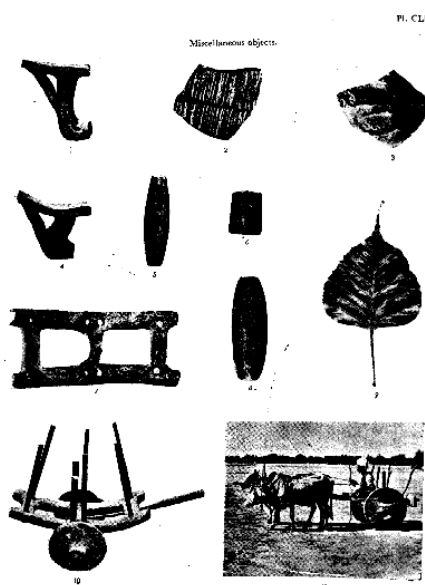
technique of bending wood with heat, which enabled them to replace heavy disc wheels with much lighter spoked wheels. These wheels comprised four or six spokes connected to a rim of curved, joined felloes. The cart's cumbersome all-wood body was redesigned with a curved wooden frame overlaid with a hide or wicker covering. The new, light conveyance became highly popular, and within two or three centuries it had not only become a



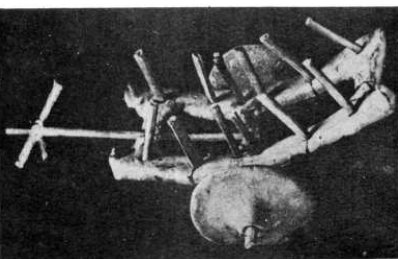
standard means of transportation in the Near East, but also penetrated as far away as Greece, northern Europe, India, and even China...During the Roman period...lighter vehicles included the **rheda**, a mule-drawn, four-wheeled cart using eight to ten mules, which could bear a maximum load of 450 kg.; the **carrus**, a four-wheeled cart, which carried 270 kg; the **verreda**, drawn by four mules, which carried two or three persons and upto 135 kg of goods; and the two-wheeled **birota**, drawn by three mules, which carried one to two passengers and a maximum of 90 kg." (Eric M. Meyers, ed., 1997, *The Oxford Encyclopaedia of Archaeology in the Near East*, OUP: David A. Dorsey, 'Carts', pp. 433-434). [Note the term

'rheda' cognate with 'ratha'; it refers to a wagon, not a battle car. Is **eriquu** cognate with **ekka**; or is the latter a derivative from **eka**, i.e. one horse-drawn cart].

Pl. CLIII, MIC (Marshall, J., *Mohenjodaro and the Indus Civilization*). Figs. 34-7 are pottery wheels. " Some pottery chariot wheels found at Kish are very like those found at Mohenjodaro, the only difference being that the Sumerian wheels have a raised hub on both sides of the



Sumerian vehicles were built up from more than one piece of wood, and very much the same form of construction, must be imagined for the wheels of the vehicles used by the Indus Valley civilization, especially as the wheels of the modern Sindi cart closely resemble those of Sumer, and like them were



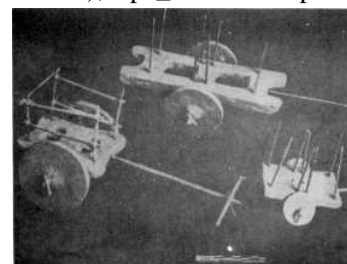
fixed to an axle that revolved with them." (vol. I, p. 354)

wheel instead of a hub on one side only, as was the rule in ancient Sind. We know for certain that the wheels of the

"In the matter of transport, one would like to draw attention to terracotta models of carts and wheels found at most Harappan sites (e.g. Marshall, 1931, Pl. CLIV, 7 and 10). That the cart reconstructed from these clay specimens resembles the modern Sindhi cart had already been suggested by Marshall (1931, Vol. II, p. 554 and Vol. III, Pl. CLIV,II). However, no less interesting than the configuration of the vehicle is the fact that even the gauge is still the same. Wheeler's excavation at Harappa in 1946 brought to light the ruts, the distance between the two corresponding ones being 1.08 m (Wheeler 1947, p.85 and Pl. XXXVB). This is identical with the gauge of the carts used in that area even now. Indeed, tradition dies hard!" (BB Lal, 1999, Decline, last phase and legacy of Indus Civilization in: GC Pande, ed., *The Dawn of Indian Civilization upto 600 BCE*, Delhi, Centre for Studies in Civilizations, p. 448-464).

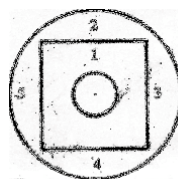
Carts and chariots of Bha_rata

[nabhya = plank containing hole of the nave of the wheel (RV 2.39.4); upa_dhi = two planks located at both sides of the nabhya (RV 2.39.4)]

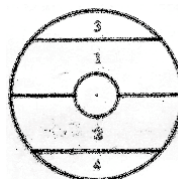


Cart and two bullocks on a potshed. Mohenjodaro.

'Let the sacrificial fire, which is like a chariot in battle, render us victorious over the enemy.' (RV 1.123.5).



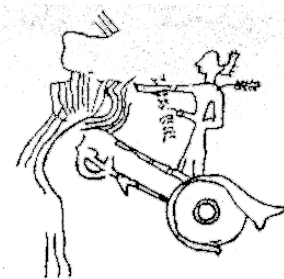
Toy-cart. Basket-type body.



Toy-cart. Lothal. Solid, flat chassis.

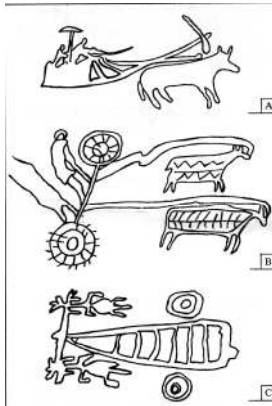
Toy-cart. Lothal. Perforated chassis.

Toy-cart. Lothal. Has perforated chassis. Wooden posts create a box-like frame.



Two types of solid wheels

Celestial cart (Panchmadhi, Madhya Pradesh)

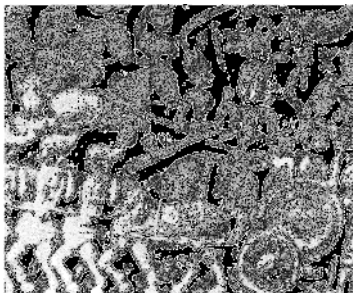


Rock carving: Vindhya (Mirzapur Dist.)

Three carts (Mandora near Attock bridge)

Chariot: middle architrave (Sa_n~ci)

'Between both poles the car horse goes pressed closely, as in his dwelling moves the doubly wedged.' (RV 10.101.11).



Chariot: Vesantara Ja_taka (Sa_n~ci)

Reins are mentioned (RV

1.38.12, 1.55.7). Heel

ropes are sanda_na;

head stall is s'i_rs.an.ya_;

cord around the third,

ras'ana_rajjurasya

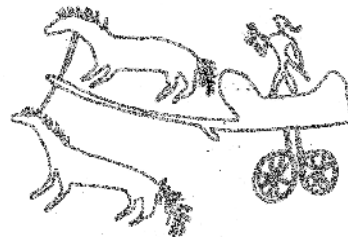
(RV 1.162.8,

1.162.16). A bridle is mentioned (RV 1.163.2).



Cart of Bodhisatva drawn by a pair of rams, going to school (Ga_ndha_ra)

Chariots of Yudhis.t.hira and Jayadratha. 5th cent. CE



Encounters, Ajanta_ Bodhisatva sees an old man. 7th cent. CE



found at the site (Fig. 10). A restored example of cart-frame is shown in Fig. 7 "



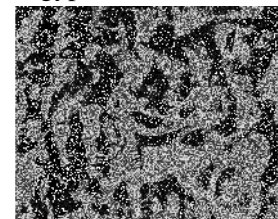
indeed, it was in Egypt. Such a vehicle must sometimes

have been employed in

moving very heavy

objects...The wheel of the

cart used in Sind to-day, as I have already pointed out, resembles that of the ancient Sumerian vehicle; it is, in fact, a superior type of roller, for the axle is so fixed that it revolved



Pl. CLIV, MIC

Fig. 11 shows the Sindi cart as of 1940's. The solid

wheels used on the cart

are comparable to the toy cart model

from one of the signs on the

stone pictographic

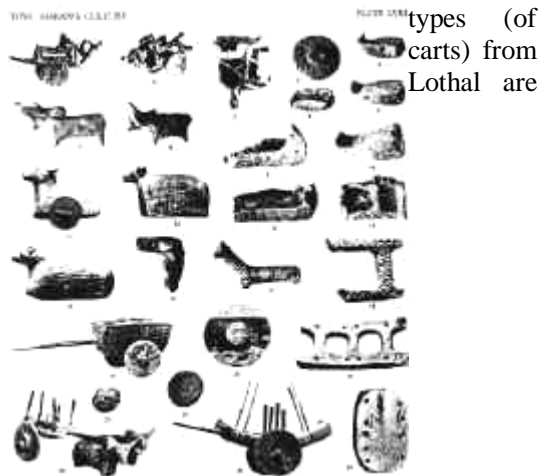
tablet from Kish that the sledge

was in use in Sumer at a very

early period, as,

indeed, it was in Egypt. Such a vehicle must

with the wheels. Two models of carts found at Harappa show no warlike features. One is made of pottery and the other of bronze. (Ann. Rep. Surv. Ind., 1926-27, pl. xxiii,d). The latter is provided with a canopy for protection from the sun. (vol. I, p.555). Pl. XXXIV B. and Pl. XXXV A., Rao, S.R., 1972, *Lothal and the Indus Civilization*, London, Asia Publishing House) "Indian game of chess or Chaturanga...A tall conical object with a button-head may stand for 'chariot' (pl. XXXIV A)...Others resemble the animal-headed gamesmen from Mesopotamia. Pl. XXXIVB brings out the close similarity between the Harappan and modern chessmen placed side by side on a modern chessboard... Three main

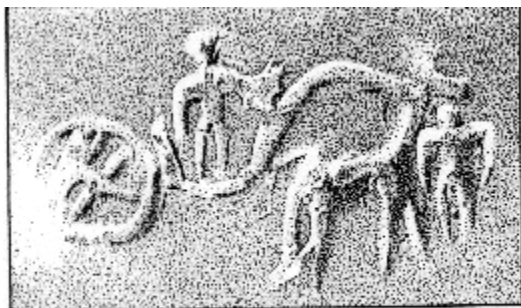


reconstructed with the help of the toy wheels and cart frames (Pl XXXV A) found in excavation. The first type has a solid chassis, which is concave or flat. The second and third types have a perforated chassis, but the latter has, in addition, a detachable cross-bar. On such a chassis wooden posts were fixed to form a box-like frame. Even now the carts in Gujarat carry such frames formed by interlacing ropes for carrying huge quantities of light goods. The wheels of Lothal carts were attached to the free projecting ends of the axle which itself was secured with leather straps to the main frame. Lynch-pins seem to have held the wheels in position...The small cart with two curved bars was the forerunner of the ekka used in northern India. It resembles to some extent the horse-

drawn chariot (ratha) described in the R.gveda." (p. 112-113, 123). "As we know that the people of the Harappa culture were well acquainted with the Sumerians, it is not surprising that both two-wheeled and four-wheeled vehicles were in use in both countries, but where the wheeled cart was originally invented it is not so easy to say. From the model carts and chariots found at Sumerian sites and their representations in relief and mosaic, we can say that the type of chariot used in Sumer was definitely less primitive than anything yet found in ancient India...We were fortunate in finding two toy carts made of metal, presumably bronze, not copper, in place of the usual pottery. The first (LVIII, 1,1) is only 2.93 inches long, 1.2 inches wide, and 1.75 inches high, and is nearly perfect, save that the front of the cart (facing right in No.1), which was originally in the same line as the rest, had been bent upwards. There are also fragments missing from the rear of the cart. Its frame resembles No. 21 in Pl. LVIII, save for having six cross-bars instead of three...The other metal vehicle found (Pl. LVIII,2) is of quite a different pattern; in some respects it resembles the 'ekka' of modern India. Its present height is 2.4 inches, its length 1.71 inches and width 1.1 inches...Each side has crossed struts between supports at each end for a pent-roof...An almost similar toy was found by Mr. MS Vats at Harappa some years ago (ARASI 1926-27, pl. XXIII, fig. d, p. 105). It also has a canopy and sides strengthened by cross-members set on an open frame; indeed, it differs from the Chanhu-daro vehicle only in having a driver, very like the little figure seen in Pl. LVIII,1. The distance of Harappa from Chanhu-daro is well over 400 miles, and the close resemblance between model carts found in these cities so widely separated argues a wide-spread and homogeneous culture in those days...Wheels. The pottery wheels of the toy carts were of three main types. Nos. 3, 20 in Pl. LVIII show the most common form, with a pronounced hub on one side, which was either roughly moulded with the fingers or finished off with a sharp instrument to obtain a better shape. In another type (Pl. LVIII,23) the hub is

not emphasized, both sides of the wheel being markedly convex. In the third type (Pl. LVIII, 24,25), the wheel is plane on both sides and frequently covered with a thick deposit of sand and mica, showing that these objects had been shaped or laid to dry on a sand bed...The three ram chariots (Pl. LVIII, 11,12,15) are typical of many that have been found at Chanhudaro, but nearly always mutilated...We now have definite evidence in a painted model wheel from Chanhudaro (Pl. LVIII, 20) that the wheels used there were...made of three solid pieces of wood securely fastened together...a fourth type of toy cart or chariot frame is shown in Pl. LVIII, 9,13...(Mackay, 1943, pp.156-166).

It will be wrong to assume that just because the wheels of 'battle cars' -- both the two- and four-wheeled varieties -- of the fourth and third millennium are mostly solid, they do not have parts such as the felly (tyre) or tripartite planks, which, it has been suggested, are the precursors to spokes.

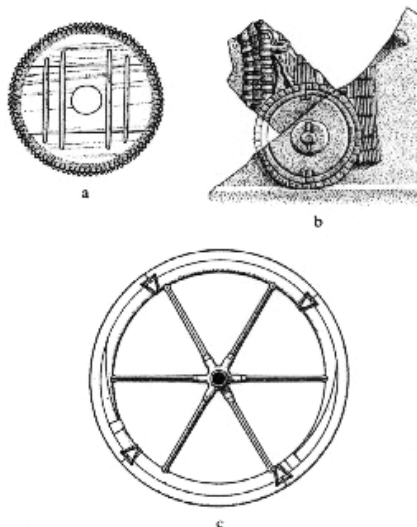


WHEEL. Figure 2. Depiction of a wheel on a seal from Hissar IIIb. Third millennium BCE. (After Littauer and Crouwel, 1979)

"It is believed that the invention of the wheel and its application to carrying loads by wagon instead of by sled took place in Sumer during the Uruk period. The construction of wagons was improved in the Early Dynastic period (ca. 2900-2350 BC). The solid wheel was replaced by a spoked one, which revolved on the axle instead of along with it. The Vulture Stela of Eannatum (ca. 2450) of Lagash (modern Tell al-Hiba) depicts the use of a four-wheeled wagon as a battle vehicle." (Michael C. Astour, '995, 'Overland trade routes in Ancient Western

Asia', in: Jack M. Sasson ed., *Civilizations of the Ancient Near East*, New York, Charles Scriber's Sons, p. 1402).

"Wheel. Archaeological evidence for the wheel appears in the Near East as early as the Early Dynastic II period (ca. 2750-2650 BCE). Earlier pictographs from Uruk level IVa (ca. 3100 BCE) show sledges raised over what are either two captive rollers or four disk wheels. Remains of actual wheels were found at Kish, Ur (Early Dynastic III), and Susa (figure 1a) in the mid-third millennium. These were all tripartite: made of three planks vertically from a tree trunk and held together by external battens as well as by rawhide, with wooden or metal tires (from 0.50 to 0.83 m in diameter) that were sometimes hobnailed...The wheels appear to revolve on fixed axles. A variation of this wheel



WHEEL. Figure 1. (a) reconstruction of a wheel type from graves in Kish, Ur, and Susa, mid-third millennium BCE; (b) depiction of a wheel on a stela of Gudea, late third millennium BCE; (c) drawing of a six-spoked wheel surviving from eighteenth-dynasty Egypt. (After Littauer and Crouwel, 1979)

first appears on a stela of Gudea in the Ur III period (figure 1b), in the late third millennium m. It shows what seems to be a relatively small solid wheel rimmed by two metal half tires with hobnail tread, secured by clamps at their ends. Actual metal tires in six or seven segments, with a clamp at either end and one in the middle, indicate disk wheels with diameters of 0.67-0.97 m. These come from early second-millennium Susa, Assur, and elsewhere. Of lasting significance were attempts to lighten the disk wheels, as first seen on a third-millennium

seal from Hissar IIIB (figure 2). On it, the central plank, through which the axle passes, is narrowed to a diametral bar; the flanking planks of the tripartite wheel are eliminated, and the former bonding slats are turned into sturdy transverse bars between the diametral bar and the felloe. This crossbar wheel is also clearly illustrated in the second millennium BCE, fixed on a revolving axle; it has remained in use with simple carts in various parts of the world. By far the most important innovation was the spoked wheel, which first appeared with four to eight spokes, in Anatolian and Syrian glyptics and other graphic remains from the early second millennium BCE. Actual four- and six-spoked wheels (figure 1c) survive from eighteenth-dynasty Egypt. These have composite spokes made from single rods, half oval in section, and heat bent in the middle to form an angle (of 60 degrees for a six-spoked wheel and 90 degrees for a four-spoked one)...Third millennium representations in Mesopotamia show disk-wheeled vehicles in military, hunting, cult, and travel contexts only. Evidence for their use in warfare, for which they were clearly unsuitable, fades rapidly after the middle of the millennium. That wheeled vehicles were considered prestigious is clear from their burial in richly furnished graves (Kish, Ur, Susa)...The appearance, in about 2000 BCE of the spoked wheel and horse draft -- both essential for true chariot -- did not produce a suitable military vehicle immediately: the team's harness and its control had to be improved first. Evidence for this appears initially on early Syrian seals of the eighteenth century BCE." (J.H. Crouwel and Mary Aiken Littauer, 'Wheel', in: Jack M. Sasson ed., *Civilizations of the Ancient Near East*, New York, Charles Scribner's Sons, pp. 343-344).

Source for Mesopotamian and Egyptian evidence: M.A. Littauer and J.H. Crouwel, 1979, *Wheeled Vehicles and Ridden Animals in the Ancient Near East*, Leiden, E.J. Brill This is a survey of mainly the archaeological evidence for transport by wheeled vehicle and on the

ridden animal in the Near East and covers mainly Mesopotamia, Iran, the Levant and Anatolia. Chronologically, the study covers the period from the 4th millennium BCE to the time of the conquests of Alexander ca 330 BCE. An extensive bibliography is on pp. 161 to 179.

The references to figures are from List of figures included in this monograph of Littauer and Crouwel.

A review of the work and a contrary view on the place or region where the technology originated and evolved:

"Wagons, carts and horse-drawn vehicles of the Earlier bronze age...The evidence reviewed in the last chapter presents us with a picture of the likely origin of disc-wheeled vehicles as centred on Mesopotamia at the end of the fourth millennium (whether 'bc' or 'BC') and a subsequent remarkably swift adoption of this novel means of transport among a wide range of prehistoric European communities from Transcaucasia and Russia to Switzerland, and from north Italy to Denmark, within five centuries or so...

"Carts, chariots and the Near East...The latest statement of the problem is that of Littauer and Crouwel (1979, 68-71). They consider that the Near Eastern evidence that they have assembled in exemplary detail' strongly suggest the possibility of a local evolution of the light, spoked-wheel horse-drawn chariot in the Near East itself, in contrast to the long-held theory that this was introduced from outside in an already evolved form by Indo-European steppe tribes;. They would see the technological genesis of the wheel with nave, felloe and radial spokes, in the cross-bar wheel, both forms being documented from the very beginning of the second millennium BC, with bent-wood techniques also of early origin, together with equid-draught with onagers. Horses too were becoming familiar Mesopotamian peoples from equally early in the second millennium

BC, and the linguistic and lexical evidence adduced for Indo-European influences is regarded as too late to be relevant to origins. 'Whatever the role of particular peoples in the origin of the spoked-wheeled, horse-drawn chariot, there appears to be no cogent archaeological or linguistic arguments against its development in the Near East itself...' (Stuart Piggott, 1983, *The Earliest Wheeled Transport from the Atlantic coast to the Caspian Sea*, Ithaca, Cornell University Press, pp.64, 103).

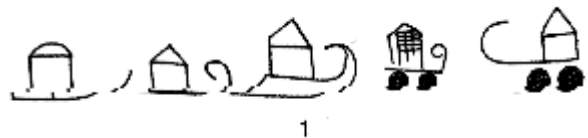
Much has been written about the origin of wheeled vehicles, the so-called 'sledge' and the 'travois/slide-car', with the sledge being considered ancestral to the four-wheeler and the travois-slide car ancestral to the two-wheeler... there is no evidence to connect the slide-car at all with any of the earliest known wheeled vehicles-- either four-wheelers or two-wheelers. These are first attested in earlier 3rd millennium BCE Mesopotamia by figured documents and actual remains, preceded in the 4th millennium by pictographic signs showing sledges and sledges on two rollers or (more likely) already four wheels, which point clearly to a sledge-with-roller origin. There is no evidence of any travois/slide-car in this region and the geographically closest document is only in the 2nd millennium Transcaucasia. (pp.1-2)...

...the triangular, A-frame cart sometimes adduced as evidence of the derivation of the original two-wheeler from a triangular travois/slide-car to which rollers have been added... Although its wide diffusion today



2

(from the Iberian peninsula to India) has been taken as proof of its great antiquity, it is noteworthy that the A-frame is nowhere attested among the numerous early two-wheelers from Mesopotamia and the Levant, all of which display the single central draught pole, nor is it found among those of the Indus civilization, which show Mesopotamian derivation. (p.10)... Childe postulated that the composite disk wheel was too complex a construction to have originated in more than one area. (Childe 1951, 193). He supported his contention that this area was Mesopotamia by a chronological chart of diffusion that has not, in its basic lines, been refuted. This type of wheel was also accompanied by paired draught. It is indeed Mesopotamia that has yielded evidence for the first development of wheeled vehicles,



in which platforms and sledges, rollers, and ploughs pulled by paired cattle must all have played a role, but not the travois/slide car (pp. 10-11)...

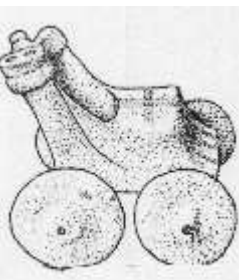
Civilian riding is documented... by the 3rd millennium in the NearEast. (p.12)...

Fig.1 Pictographs on clay tablets, Uruk (after Falkenstein 1936, nos. 741, 745, 744)

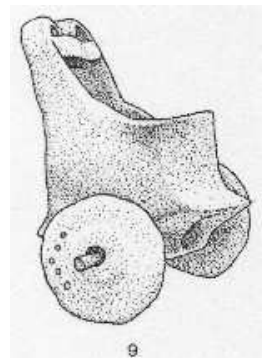
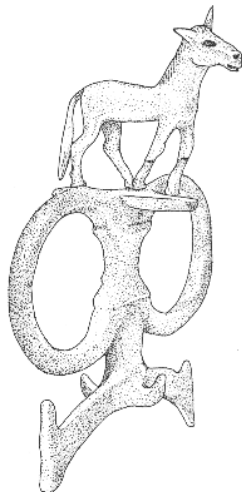
Fig.2 Stone plaque. London,BM 128858 (after museum photograph)

Late 4th millennium BCE

The first evidence for the use of wheeled vehicles comes from the site of Uruk in southern Mesopotamia. It consists of simple pictographic signs on inscribed clay tablets found in Uruk



level IVa (ca 3200-



3100 BC). The signs represent sledges with runners in front, as well as similar sledges raised over what may be either two (captive) rollers or four disk wheels (fig.1)...These earliest vehicles are always shown with a roofed



superstructure. That the latter may represent a covered litter is suggested by a very small unprovenanced steatite plaque of the same period, which shows an important personage (or, conceivably, an effigy of a deity) seated in a litter with an arched tilt, the legs of which are set on such a sledge (fig.2)...The sledge on the steatite plaque is drawn by one or two bovids...equid draught begins only in the earlier 3rd millennium BCE....The pictographs, taken

together with the plaque, suggest that sledges, with and without rollers or wheels, were used to convey important people or effigies of deities in litters or even merely under a tilt. This, of course, does not mean that they may not also have been used simply as flat cars for the transport of bulky or heavy material over reasonably smooth terrain. (pp.13, 14).

Fig.4 Terra-cotta model, Kish. Oxford. Ashm. 1925. 291 (after museum photograph)

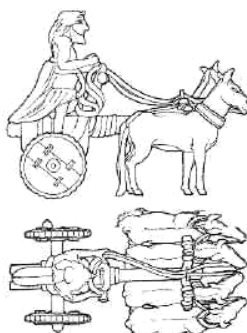


Fig. 6 Shell inlay, Nippur (no. 6N-169) (after Littauer and Crowell 1973, fig.4)

Fig.7 Copper model, Tell Agrab. Baghdad, Iraq Museum 31389 (after Frankfort 1943, pl. 58-60).

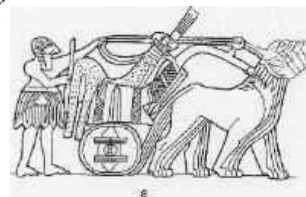


Fig.8 Detail of stone plaque, Ur. Philadelphia, University Museum CBS 17086 (after Woolley 1934, pl.181: b)



Fig.9 Terra-cotta model, Kish. Chicago, Field Museum of Natural History FM229170 (after Langdon 1924, pl. VII: 3)



Fig. 10 Silver and electrum terret, Ur. London, BM 121438 (after Woolley

Fig. 11 **Shell inlay, Susa.** Paris, Louvre Sb 5631 (after Amiet 1966, fig. 143)

Fig. 12 a-b **Two shell inlays, Mari.** Paris, Louvre (after Parrot 1967, pl. LXV:no.2468, 1956, pl. LVII: no.451)

Earlier 3rd millennium (to ca. 2375 BCE)

Four-wheelers. Most of the representations, both two- and three-dimensional, are from Mesopotamia, and appear to show wagons of a single type that has sometimes been called a 'battle car' because it is usually depicted in a military context. The documents include inlays such as the 'Standard of Ur' (fig.3), a relief on the 'Vulture Stela' of Eannatum of Lagash, a vase painting, and several cylinder seals and terracotta models (fig.4), some of which may perhaps belong to the following period. The wagons are narrow, rectangular vehicles, with a box only wide enough for one person abreast, and are mounted on four disk wheels set close together. The box has a high front, reinforced by diagonally crossed struts and topped by an open handrail that is depressed in the centre, and it has low, panelled side screens...The wagon may carry one or, at most, two persons... Information on certain details of construction of these wagons is yielded by the remains of a few actual wagons found in graves at Kish and Ur, and at Susa in Elam...Axles. The wooden axles ran under the floor near each end...Actual linch pins of wood were found in a grave at Kish...A pole that is connected with the axle must clear the floor as it swings, and for this the floor must be raised above the axle on an undercarriage, at

least in front. One wagon at Ur that had rear wheels .80m in dia. and front wheels .6m, resulting in ca. .1m difference in axle level, might suggest such a possibility. But this clearance would hardly be enough to permit proper vertical articulation of a straight pole, and the more frequently seen high, arching pole would have been unsuitable for attachment to a swivelling axle...(pp.16, 17). Wheels. The actual wheels found in graves, and all those rendered in detail on the figured documents of the period appear to have been of tripartite-disk construction. They are made of three planks, the central one, through which the axle passes, being either lentoid in shape (fig.3) or straight-sided where the flanking planks join it (fig.5)...The function of a nave on disk wheels, particularly those that revolve, is to reinforce the area through which the axle passes, to keep the wheel perpendicular to the axle and prevent it from wobbling... Tyres also played an important role, not only in protecting the tread, but in consolidating the three parts of the wheel...a hide tyre was noted at Ur; at Susa, a wooden tyre, .045m in depth, and flush with the faces of the wheel (ca .83m in diameter), was pierced by 'copper' hobnails (fig.5), and the hobnails of the treads of the wheels found at Kish may well have pierced a rawhide tyre. Hobnails are often recorded in the figured evidence on both four- and two-wheelers (fig.7). Stone reliefs of two-wheeled 'straddle cars' from Ur (fig.8) and the Diyala region also show a narrow, rigid band that stands out around the tread, suggesting metal rather than rawhide, and actual metal tyres were found at Susa dating approximately the end of the millennium. Such tyres, which must have been of copper or bronze, would not only have been much softer than iron, but could not have been 'sweated on', as much later iron tyres were and, in the absence of hobnails, could have easily worked loose with the expansion and contraction of the wood...Where disk wheels were found apparently without tyres, as in the later Caucasian tombs, the vehicles were ox-drawn, indicating slow and less strenuous draught...(pp.18,19).

Two-wheelers. Straddle Car. This type is documented by figures in the round, including a copper model from Tell Agrab (fig.7), one stone and several terra-cotta examples, models, also probably of straddle cars, decorate a few metal objects said to come from Luristan in west-central Iran. Among the linear representation are stone reliefs (fig.8), including one on the 'Vulture stela', a sealing and several cylinder seals.

The Tell Agrab model yields the most explicit information about this vehicle. It consists of a thick pole raised over the axle to yoke height and within a casing that rests on the axle. There is no siding, but a rectangular railing, composed of horizontal cross bar and two uprights, inclined slightly forward, rises to waist height directly in front of the single occupant. He may sit or stand astride the pole casing, with his feet on the axle or on ledges just in front of the axle. This places his weight, when sitting, directly over the axle, where it would be in balance and would least load the necks of the team. In fact going he could stand, stabilizing the vehicle with his weight just ahead of the axle fulcrum and using the hinges of his ankle, knee, and hip joints as springs to absorb the jolting. He could also grip the sides of the pole casing between his thighs and calves for greater security when necessary. Representations of similar cars on stone reliefs from Ur (fig.8) and Khafajah show a saddle seat with a high cantle behind and draped with an animal skin, as does one on a sealing from Ur. (p.21).

Equids, osteological evidence...in interpreting documents in all categories -- osteological, artistic, textual -- nine possibilities must be considered: hemiones, asses and horses, and any of the six possible crosses between them...Equid *hemionus*. The great majority of equid bones from this period and earlier have been attributed to hemiones, although Ducos believes he has found a Near-Eastern subspecies of *asinus* among them. Of two recent important EDIII finds of complete

skeletons in southern Mesopotamia, one has been definitely, the other provisionally, identified as *hemionus onager*...*Equus caballus*. Remains are reported from recent excavations at Tal-i Iblis in south-central Iran. They belong to two individuals, one from level I (ca 3500 BC), the other from level IV (ca 3000 BC). (pp. 23-24)...The three separate species and six possible crosses perhaps present in the Near East at this time make interpretation of figured documents extremely difficult, although much has been written in the literature about the means of distinguishing between some of them... (pp. 24-25)...

Equids, textual evidence

A major problem is whether the various composite forms of the basic Sumerian term ANS.E refer to different species of ANS.E or to different functions of ANS.E. Another is whether these terms had the same meaning in all localities and throughout the whole period considered...The term ANS.E, used by itself, appears already in the Jamdat Nasr period and clearly denotes , a domestic equid. Its translation remains disputed, some regarding it as a generic term for 'equid', others preferring a more specific meaning -- usually 'ass' or, more rarely 'hemione'. In the ED period ANS.E is often referred to in connection with agriculture, particularly ploughing. In one case, a connection with wheeled vehicles may be assumed. (p. 27)...All this combined evidence still leaves us with the question of exactly which equids were used with the 'battle cars' and other vehicles. While they were apparently seldom, if ever, horses, it is impossible to tell whether domestic ass, tamed native hemione or any of the possible crosses were favoured, or whether all of these may not have been experimented with...One Jamdat Nasr text refers to a 'team of ANS.E.KUR'... Whether this term already refers to horse as does ANS.E.KUR.RA that appears in texts of the Isin-Larsa and later periods, rather than to another equid is uncertain... (p.28)...

Wheeled vehicles; textual evidence

Relatively few cuneiform documents contain explicit references to wheeled vehicles, usually written as GIS.GIGIR. This term, possibly attested as early as, continues in use for more than 2000 years....Of special interest is a text from Fara (EDIIIa), where vehicles are assigned to individuals who are described as 'going into battle', or 'leaving battle', thus confirming the military use of vehicles that is illustrated in contemporary figured documents. Other texts refer to the vehicle of the god Ningirsu and its 'carriage house'. (p.34).

Four-wheelers, equid-drawn

One marked difference between the wagons in the later 4th millennium pictograms and those illustrated in the 3rd millennium is at the front, where there is now a fairly high screen. This new construction may have been stimulated by the introduction of equids as draught animals...this breastwork, with its two apertures near the top, was a military expedient, that it was a protection behind which the warrior could shield himself and from which he could spy the enemy...this type of wagon is very often depicted with a sheath of throwing spears attached to the front edge of the breast-work and in a military context, so it must have been used in warfare at this period. The most graphic illustration of this is a scene on the 'Standard of Ur, showing a row of four wagons, manned by helmeted drivers and warriors, the latter standing at the rear and carrying spears or an axe...These wagons could have functioned as mobile arsenals and firing platforms from which javelins, carried in sheaths attached to the right front corner of the breastwork, could have been thrown most effectively when moving along the front or flanks of massed infantry. (fig.3)...The same is true for the 'Vulture stela' of Eannatum, where not only javelins but close-range weapons -- axe and sickle sword -- are carried on the battle wagon. (pp.32,33)

Two-wheelers, equid-drawn



Straddle car. As probably the lightest and best balanced of the vehicles discussed, and the one

that gave st security in fast going, this would have been particularly useful where speed was required...the straddle car may have served as a fast courier's transport, as is perhaps illustrated by the unarmed copper model from Tell Agrab (fig.7) (pp.33, 34).

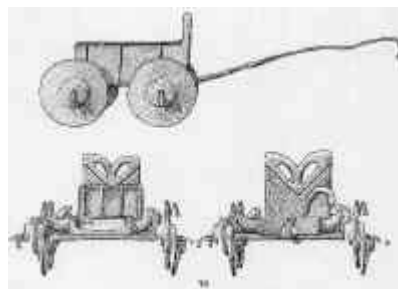


Fig.13 Detail of cylinder seal. New York, Morgan coll. 220 (after Porada 1948,pl. XXXIV)

Fig.14 **Three views of copper model.** Paris, Louvre AO 2773 (after museum photographs)

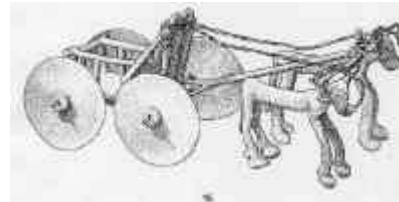


Fig.15 **Copper model.** New York, MMA acc. no. 66.15 (after museum photograph)

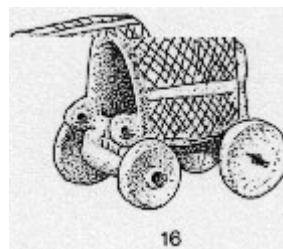


Fig.16 **Terra-cotta model,** Tepe Gawra. Philadelphia, Dropsie College (after Speiser 1934, pl. XXXV:a2)

Fig.17. **Detail of cylinderseal.** Philadelphia, University Museum CBS 5028 (after museum photograph)



Fig. 18 a-b. Fragments of stone relief. Berlin, VA 2904 (after Moortgat 1967, pls. 192-192)

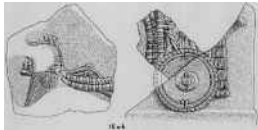
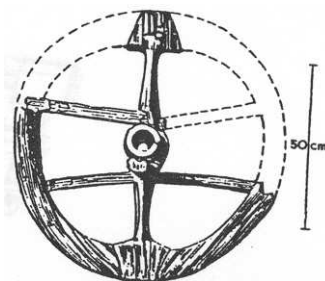


Fig. 20 Two views of terra-cotta model, Ashur (after Andrae 1922, pl. 61: c-d)



Fig. 21 **Detail of cylinder seal, Tepe Hissar.** Teheran, Iran Bastan Museum (after photograph, Philadelphia, University Museum)

MEL Mallowan (1965, Early Mesopotamia and Iran, London, Thames and Hudson, p. 123) notes: "...dating Tepe Hissar IIIB a little before 2000 B.C... in Hissar IIIB the skull of a horse was found and furthermore the horse is alleged to have been domesticated at Shah Tepe much earlier still, thus long anticipating the first appearance of it at Boghazkoy in Central Asia Minor in the early Hittite period...."



The wheel shown in Tepe Hissar cylinder seal is comparable to the cross-bar wheel from Mercurago,

Italy. Late Bronze Age. After Childe, V. Gordon, 1954, Rotary motion. In: Charles Singer et al. (eds.), *A History of Technology*, 1: 187-215. Oxford: 214 fig. 135.

Detail of seal impression. Paris, Louvre (de Clerq coll. 284) (after Museum photograph)

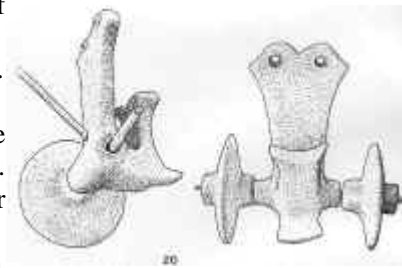


Fig. 25. Cylinder seal. New York, Morgan coll. 893 (after Porada 1948, pl. CXXXIV)

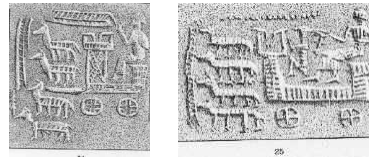


Fig. 29 Detail of seal impression, Kultepe, Karum II (after Ozguc N. 1965, pl. VIII: no.24)

Late 3rd millennium BCE (ca. 2375-2000 BCE)

Most of the representations show wagons that closely resemble the 'battle car' of the previous period. They include a sealing and cylinder seals (fig.13), two metal models from Syria (fig. 14) and several others that are probably from southeast Anatolia (fig.15).(p.37).

Wheels are of disk type. On the seals, tyres of



some kind appear, but without hobnails, and a tripartite construction is shown only once (fig.13)...Single-piece wheels are

reliably documented only on the Pontic and Caspian steppe and in Holland, in contexts attributed to the late 3rd millennium BCE (p.38)...

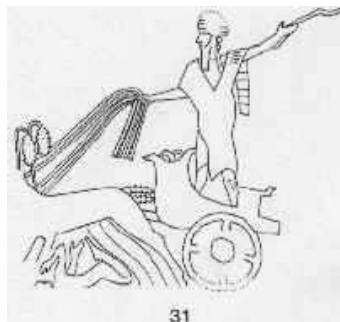
Straddle car. Wheels...stone relief...shows axle end, nave, linch pin and a tyre (almost certainly of metal) made in two segments with clamps at either end. The tread is hobnailed. The tyre is



30

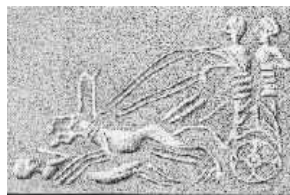
true of the 'straddle car'...(p.47).

Fig. 30 Mould-made decoration of front screen of fragmentary terra-cotta vehicle model, Uruk Berlin, VA 11576 (after Ziegler 1962, pl. 8: 137)



31

Buchanan 1971, pl. II:c)



32

Fig. 32 Detail of cylinder seal. New York, Morgan coll. 971 (after photograph of E. Porada)

very reminiscent of actual 'bronze' tyres from Susa, from a two-wheeler of uncertain type, found in the same tomb as linch pins, and possibly contemporary with the relief (fig.19)(p.39)...

The 'battle car' seems to have been relegated to cult use and the same may have been

Fig. 34 Detail of cylinder seal. Paris, Bibliotheque nationale 480 (after Delaporte 1910, pl. XXXII)



Fig. 35 Detail of cylinder seal. Oxford, Ashm. 1920.25 (after museum photograph)

Fig. 36 Detail of cylinder seal (After Amiet 1969, fig. 9)



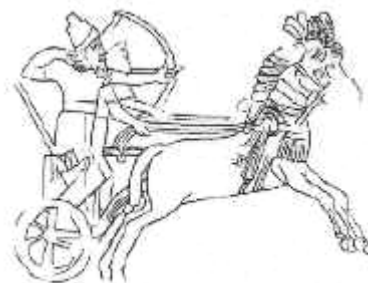
Fig. 39 Detail of cylinder seal. Paris, Louvre AO 20.138 (after museum photograph)



35

Fig. 40 Detail of seal impression, Nuzi (after photograph, E. Porada)

Fig. 41 Detail of 'White Obelisk', Nineveh. London BM 118807 (after Orthmann 1975, pl. 206)



41

Fig. 42 Chariot, Thebes, tomb. Florence, Museo Archeologico 2678 (after museum photograph)

Fig. 43 Detail of wall painting, Thebes, tomb of Rekhmire (after photograph of copy in New York, MMA acc. no. 31.6.34)



Fig. 44 Detail of stone relief of Ramesses III, Medinet Habu (after Nelson 1930, pl.71)

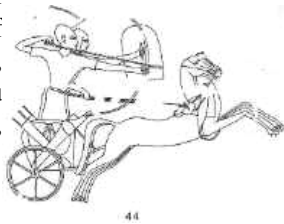


Fig.45 Detail of stone relief of Ramesses II, Abydos (after Treue 1965, p.104; Wreszinski 1935, pl.21:a)

Fig. 47 Wheel, Thebes, tomb of Tut'ankhamun. Cairo, Archaeological Museum Journal d'entree 61993 (after drawing H. Carter, object no. 144 of chariot no. 161, photograph, Oxford, Griffith Inst.)

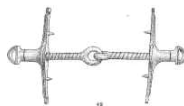


Fig. 48 Bronze horse bit, Tell el Ajjul. Jerusalem, Rockefeller Museum 37.3271 (after museum photograph)



Fig. 49 Bronze horse bit, Tell el Amarna. Oxford, Ashm. 1933.1209

(after museum photograph)
Fig. 50 Two views of antler checkpiece of horse bit,

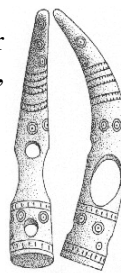
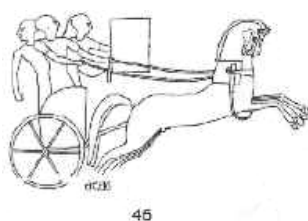


fig.5)

Beycesultani (after Foltiny 1967,

Fig. 51 Detail of stone relief of Ashurbanipal, Nineveh. London, BM 124939 (after Barnett 1975, pl. 137)

Fig. 52 Detail of stone relief of Ashurbanipal, Nineveh. London, BM 124802 (after Barnett 1975, pl.160)



Second millennium BCE

...Draught is by two horses

under a slender yoke, the latter being adapted to equine anatomy by the use of yoke saddles...The metal bits have a bar or jointed mouthpiece, passing through holes in the cheekpieces which act as toggles across the corners of the horse's mouth...The reins are attached to the ends of the mouthpiece...Chariots play an important role in warfare in this period...Two Asiatic and Egyptian chariots, carrying an archer, are



used chiefly as mobile firing platforms and play a fast, flanking and pursuing role...Chariots are also used for non-military purposes, including



prepared hunts and ceremonies

...Horseback riding in military contexts is confined to couriers or scouts, or to members of defeated chariot crews



fleeing on animals cut loose from harness. (p.98).

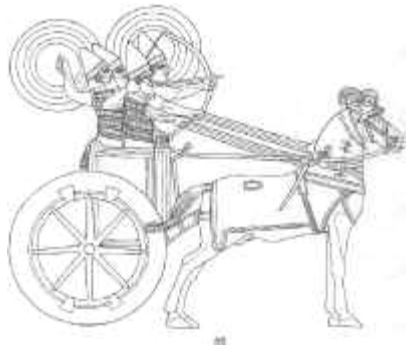


Fig. 53
Detail of
stone relief
of
Ashurnasir
pal II,
Nimrud,
Berlin, VA
959 (after
Meyer
1965, pl.

109).

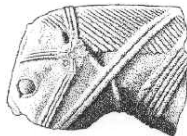


Fig. 55 Detail of stone relief
of Tiglath-Pileser III,
Nimrud. London, BM
118908 (after Barnett and
Falkner 1963, pl. LXXI)



Fig. 56 Detail of
stone relief of
Ashurbanipal,
Nineveh. Berlin, VA 961 (after Meyer 1965, pl.
161)

Fig. 57 Detail of stone relief, Malatya. Paris,
Louvre AO 255 (after Enclopedie 5, p. 291)



Fig. 58
Detail of
stone
relief, Sakca
gozu.
Berlin, VA
971 (after
Meyer
1965, pl.

90)



Fig. 60 Terra-cotta model,
Marathus-
Amrit, Paris, Louvre S9
(after museum
photograph)

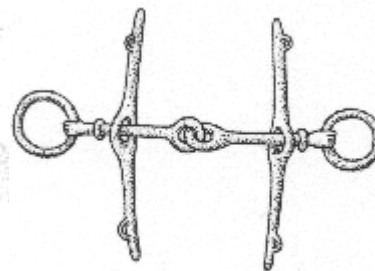


Fig. 62 Detail of stone
relief of Ashurbanipal,
Nineveh. London, BM 124859 (after museum
photograph)

Fig. 63 Two views of stone head, Zinjirli.
Berlin VA 3008 (after von Luschan 1911, figs.
245-246).

Fig. 64 Two views of stone head, Zinjirli.
Berlin VA 3004 (after von Luschan 1911, figs.
248-249).

Earlier First Millennium BCE (ca. 1000-600 BCE)



Wheeled
vehicles.
Wagons
and
carts, when
pictorially
documente
d, are small
and light,
with spoked



wheels. They are
mule or bovid-
drawn and
mostly belong to
the
commissariat.
This period
witnesses the
supremacy of the
light, fast, horse-
drawn chariot,
which is best
documented by
surviving examples from Egyptian tombs and

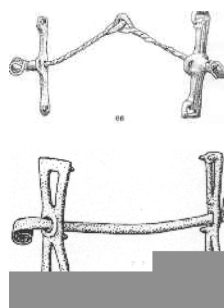
by detailed representations also from Egypt. The vehicle is characterized by a very wide wheel base... and by a low-sided box, open at the rear and wide enough for two men to stand abreast... Wheels revolve on a fixed axle... In one type (attested in Egypt), the spokes



1972, pl. LVIII: no.1694)

Fig. 70 Bronze horse bit, Nimrud. London, BM 91187 (after Potratz 1966, pl. 122)

Fig. 71 Detail of stone relief of Ashurbanipal, Niniveh. London, BM 124875 (after Barnett n.d., pl. 89)



nave; in the other (attested in Transcaucasia), the spokes are single and the nave is a simple one-piece cylinder of wood. Both types of wheel have felloes composed of overlapping sections of bent wood. Rawhide tyres are often indicated.

Fig. 65 Bronze horse bit, Tan-i-Hamamlan (after Thrane 1964, fig.5)

Fig. 66 Bronze horse bit, Ashur. Berlin, VA 7284 (after Potratz 1941, fig.2)

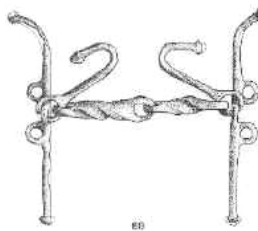
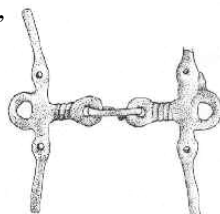
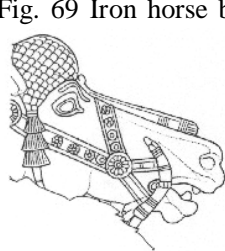


Fig. 67 Bronze horse bit, Sialk B, tomb 74 (after Ghirshman 1939, pls. XXV:1, LXXV: no.S.924)

Fig. 68 Bronze horse bit, Bogazkoy (after Boehmer 1972, pl. LVIII: no.1694)

Fig. 69 Iron horse bit,



Bogazkoy (after Boehmer 1972, pl. LVIII: no.1694)

Fig. 72 Detail of stone relief of Sennacherib, Nineveh. London, BM 124873 (after Porada 1965, pl. 21)



Fig. 76 Detail of stone relief of Ashurnasirpal II, Nimrud. London, BM 124544 (after Yadin 1963, 384-385)

Fig. 77 Detail of stone relief of Tiglath-Pileser III, Nimrud. London, BM 118907 (after Barnett and Falkner 1963, pl. LXVII)

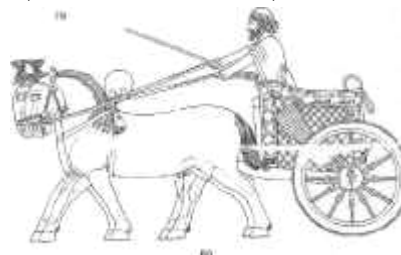


Fig. 78 Detail of stone relief of



Ashurbanipal, Niniveh. Paris, Louvre AO 19909 (after Encyclopedie 6, p.20) Fig. 80 Detail of stone relief, Persepolis (after Hinz 1969, pls. 38:

a, 24)

Fig. 81 Detail of cylinder seal. London, BM 89132 (after museum photograph)



(after museum photograph)

Fig.82 Gold model, 'Oxus treasure', London BM 123908

Fig. 83 Two views of bronze model. Paris, Louvre 22265 (after museum photograph)

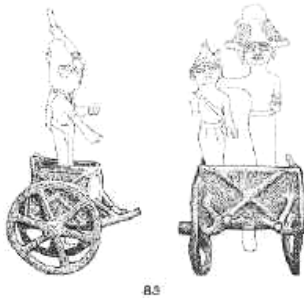


Fig. 84 Two bronze horse-bits, Persepolis (after Schmidt 1957, pl. 78-79)

Fig. 85 Fragmentary cylinder seal. London, BM 89816 (after Wiseman n.d., 115; Boardman 1970, pl. 904)

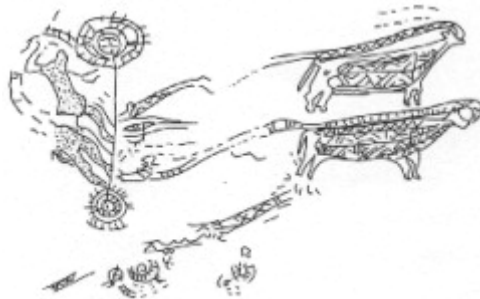


"Chariots. In the Near East the chariot was a light, open vehicle with two spoked wheels, drawn by horses yoked on either side of a draught pole. It was used primarily in warfare, but also in hunting and processions. The first known examples with these features appear in Anatolian glyptics of the early second millennium BCE, followed by those depicted on Syrian seals of the eighteenth and seventeenth centuries BCE. In Mesopotamia the chariot had been preceded by disk-wheeled vehicles with both two and four wheels, pulled by asses or ass/hemione or ass/horse crosses.

Five innovations gave the true chariot its superiority: the spoked wheel; the exclusive use of horse draft (with an adaptation of the yoke for this purpose); the replacement of the old nose-ring control by a proper horse bit; the use of the bow as a primary chariot weapon; and proportions permitting a crew of two to stand abreast." (J.H. Crouwel and Mary Aiken Littauer, 'Chariots' in: Jack M. Sasson ed., *Civilizations of the Ancient Near East*, New York, Charles Scribner's Sons, pp. 485-487).

Ratha in the Indian Tradition

The chariot is integral to the Indian tradition from Vedic times. The chariot is a recurring motif in Indian sculptural tradition. The *Bhagavad Gita* (the song divine, which is the quintessence of Indian philosophy) is narrated in the Great Epic, the *Mahabharata*, as Arjuna tries to extricate a wheel of his chariot from the battlefield.



We will now present the picture of the India

n chariot as it emerges from the Indian Art tradition and from the textual tradition, starting with the R.gveda.

The presentation draws extensively from the review presented in Marcus Sparreboom's doctoral dissertation presented to the Rijks University of Leiden. (Sparreboom, Marcus, 1985, *Chariots in the Veda*, Memoirs of Kern Institute, no.3, Leiden, EJ Brill)

Many toy representations of vehicles, frames, and wheels are reported from Chalcolithic times at Alamgirpur, Chanhudaro, Harappa, Kalibangan, Lothal and Mohenjodaro. Wheels

of various types have been reported in abundance: wheels made with hubs on one side or either side, wheels with no hubs, bi-convex wheels. (A survey is available in: Margabandhu, C., 1973, *Technology of transport vehicles in early India*, in: *Radiocarbon and Indian Archaeology*, ed. D.P. Agrawal and A. Ghosh, Bombay, pp. 182-189). Kaus'a_mbi_ examples are cited. (1st century BC: see Kala, 1980, *Terracottas in the Allahabad Museum*: fig. 209, 325a and b; terracotta plaques dated to 1st and 2nd cent. BCE depicting chariots: figs. 153,109; seal from Jhusi -- 2nd cent. BCE -- shows hindlegs of horses and a chariot-wheel and two persons sitting in the chariot: Chhabra, B.Ch., 1961, *Antiquities from Jhusi and Other Sites*, *Lalit Kala*, 9: 11-15, pp. 11-12, pl. IV, fig.1; see also Thaplyal, K.K., 1972, *Studies in Ancient Indian Seals*, Lucknow: 118, 190, 246, 268, 274; Other illustrations in Sharma, G.R., 1969, *Excavations at Kaus'a_mbi_ 1949-1950. Memoirs of the Archaeological Survey of India*, 74: pl. xlv and xxviii A and B).

A round terracotta plaque from Bhi_t.a_, Va_ran.a_si_ district (ca. 2nd cent. BC) shows a chariot probably drawn by horses; the model is strikingly similar to those represented on the railings of the Sa_nchi_ Stu_pa. (Dhavalikar, M.K., 1977, *Masterpieces of Indian Terracottas*, Bombay: 54, pl. 35).

Many are heavier type transport vehicles and ox-drawn carts. The finds at Harappa and Mohenjodaro have been tentatively dated to ca. 2500-2000 BC; 1998 discoveries by Kenoyer and Meadow at Harappa may take the date back to ca. 3300 BCE. (<http://www.harappa.com>) It has been suggested by Piggott that in some cases, horses may also have been used. (Piggott, S., 1970, Copper vehicle models in the Indus Civilization, *JRAS*, 122: 200-202). During the historical periods, toy vehicles -- many with spoked wheels, covered wagons, transportation carts and also chariots -- made of bronze, copper or terracotta, recorded from sites such as: Atranjikhara, Brahmapuri, Cha_rsada,

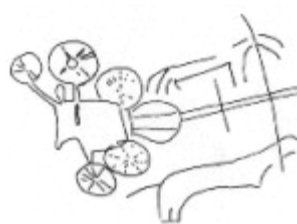
Rairh, Rangmahal, Sambhar, Taxila. (Margabandhu, 1973).

Some cave paintings, some dated perhaps to Mesolithic times, are reported from areas near Bhopal.

Painting of a chariot; Dharmapuri, Bhopal (After Wanke, L., 1977, *Zentralindische Felsbilder*, Graz, fig.38 and Pl. 29b; loc.cit.Sparreboom, Marcus, 1985, *Chariots in the Veda*, Memoirs of Kern Institute, no.3, Leiden, EJ Brill) Dharmapuri shelter is a cave near Bhopal.

"The yoke and the chariot box are lacking and the only reason for identifying it as a chariot, is the swift action which is suggested by the dynamic standing figures...The Dharmapuri painting and the other car depictions...these vehicles may be considered more primitive, and perhaps earlier types of chariots, since they have no counterpart in any of the known sculptured chariots; even the chariot of the R.gveda appears to be a more complex vehicle. Due to the difficulties in dating and the lack of conclusive evidence, firm conclusions are not justified, but the possibility cannot be ruled out that some of these simple Bhopal vehicles represent a type of pre-Vedic chariot." (Sparreboom, M., 1985, p. 101)

The chariot is painted using red paint. The wheels of the chariot, which seems light-weight are spoked. Two men are standing close to the



axle, perhaps on a small platform. The two animals may be equids or bovines and are reined from the animals' mouths to the drivers.

Remains of painted wheels appear around the scene.

"Dating rockpaintings is difficult. An approximate date could be acquired if the design or the style of a painting could be traced on pottery or if pieces of worn haematite could

be gathered from stratified deposits in or near the caves. In caves at Bhimbetka, also situated near Bhopal, such associations have indeed been found. Consequently, some of the paintings could be attributed to Mesolithic times. (Misra, V.N., Y. Mathpal and M. Nagar, 1977, *Bhimbetka: Prehistoric Man and his art in Central India*, Poona)....it is carefully suggested by Allchin (1958) that the chariots at Morha_na_ Paha_r may form a record of a sortie, most probably in the early centuries BC, from some centre in the Ganges Jamuna Doab into the territory of hunting tribes who still used no metal. This suggestion may further be corroborated by the presence of very realistic chariots on the railings and gates of sa_nchi_stu_pas, which are dated at approx. the first century BCE. These chariots do not basically deviate from the Moha_na_ Paha_r chariots. Both have rounded hoops as their sides and fronts. The yoke is straight and placed high on the necks. At Sa_nchi_ too, both chariots are drawn by two and those drawn by four horses are recorded." (Sparreboom, M., 1985, p. 101). NOTE: The round hoops in front and side of the chariot is paralleled by the hoops shown in the Chanhudaro chariot-box.



Bronze toy from Rairh, depicting a chariot (After Margabandhu, C., 1973, Technology of transport vehicles in early India, in:

Radiocarbon and Indian Archaeology, ed. D.P. Agrawal and A. Ghosh, Bombay, fig.4, p.100) See also Rau, 1977, Ist Vedische Archäologie möglich? *ZDMG: Zeitschrift der Deutschen Morgenländischen Gesellschaft*, Suppl. III.1.xix: lxxxiii-c. The chariot model "is provided with high sloping and voluted sides. A yoke is attached to the pole, which is curved upwards. The three beams running from the chariot-box to the pole are interesting, since they may possibly be identified as the trivenu or tridanda, a 'threefold piece of bamboo', which is

frequently mentioned in the Mbh. Hopkins (Hopkins, E.W., 1889, The social and military position of the ruling caste in ancient India, as represented by the Sanskrit Epic, *JAOS*, 13: 57-376, repr. as a book: Varanasi, 1972; p. 186, note) suggested that this piece was formed of



the pole and two pieces running from the axle to the pole on either side, or that it was a triangle of bamboo, one side of which was parallel to the axle, the other two running together to the pole. The first of

these possibilities is recognized in some model vehicles as illustrated in Margabandhu, the other suggestion is not evidenced by model carts. In the case of the Rairh chariot neither of these descriptions would fit. A definite identification would, however, require more evidence than one toy-chariot." (Sparreboom, M., 1985, p. 104).

Painting of a chariot with two horses; Morha_na_ Paha_r, Mirzapur District (After Allchin, B., 1958, Morhana-Pahar: A rediscovery, *Man*, 58: 153-155, pl.M)

The chariot is drawn by two horses; the rear wheels and the axle extend beyond the frame of the chariot. Two spoked wheels are also shown in the chariot front represented by a loop through which the draught-pole passes. The pole rests on a straight yoke.

Painting of a chariot with four horses; Morha_na_ Paha_r, Mirzapur District (After Allchin, B., 1958, Morhana-Pahar: A rediscovery, *Man*, 58: 153-155, pl.M)

Battle car

The chariot seems to have a long straight bar linked to the central draught-pole projecting



from the bottom frame of the chariot-box, in which stands a charioteer. The box has a high curved front similar to the curved top shown in the Chanhudaro model. The reins he holds run upto the horse's necks. The axle is at the rear-end of the chariot-box and extends beyond the width of the chariot-frame. The two wheels have six spokes each. A warrior stands in front of the chariot, holding perhaps a shield and a mace or sword and another, an archer holding bow and arrow is shown on the side.

"Allchin mentions (Allchin, B.,1958, Morhana-Pahar: A rediscovery, *Man*, 58: 153-155) another scene which may be related to the chariots, on the roof of a more easterly cave in the same group. It shows a man on horseback with a long spear being attacked by five or six bowmen similar to the one in the chariot scene. These are the only representations of ridden horses and horse-drawn chariots which have been recorded from the Bhainswar area and, according to Allchin, the only paintings there which suggest the presence of metal-using people. The style and original red colour of these drawings strongly suggest that they were done by the same people who executed numerous hunting and dancing scenes all round. Pieces of worn red and purple haematite, in

association with stone tools have been found in the caves, but metal objects have been found to be totally absent." (Sparreboom, Marcus, 1985, *Chariots in the Veda*, Memoirs of Kern Institute, no.3, Leiden, EJ Brill, p. 99).

From Elizabeth Errington and Joe Crib with Maggie Claringbull, eds., 1992, *The crossroads of Asia: transformation in image and symbol in the art of ancient Afghanistan and Pakistan*, New York, The Ancient India and Iran Trust:



Fig. 163. Vase with incised scenes (Bronze with high tin content (?), 1st cent. BC; Gondla, Himachal Pradesh; ht. 15.2 cm; British Museum OA 1880-22; Horne, 1871, pp. 367-75; Rowland, 1977, pp. 106-7).

"Although no known as the Kulu vase and attributed in British Museum records to the Khangra District, the vase was actually found considerably further to the north, in the Lahul and Spiti region of Himachal Pradesh. Gondla (variously also Gundlah or Ghundla) lies about 8 km due south of Kyelag, on the north bank of the Chandra river, one of the source tributaries of the Chenab river...a ruined Buddhist monastery. In it, local people found a 'brass vase, and some dishes of *kassa*, or mixed metal'... they were found in one of the rooms of the monastery, specifically, either a vaulted shrine or a subterranean vaulted store room...the silvery appearance of the metal and its brittle condition indicate that it may have a high tin content. The surface is very worn with a dark patina, but no thick corrosion products...The base of the vase is covered by a multi-petalled lotus with a central disc of punched dots encircled by radiating lines. Around the flower are chevrons, each containing a punched dot...Between these designs of the shoulder and base is a central panel illustrating a cavalcade proceeding in an anti-clockwise direction around the body of the vessel. This does not depict a single event, but several individual scenes, each involving the same principal figure. The procession is led by two horsemen, both carrying a halberd complete with a hooked ankusa or elephant goad, and their feet thrust into stirrups. Following them on a caparisoned

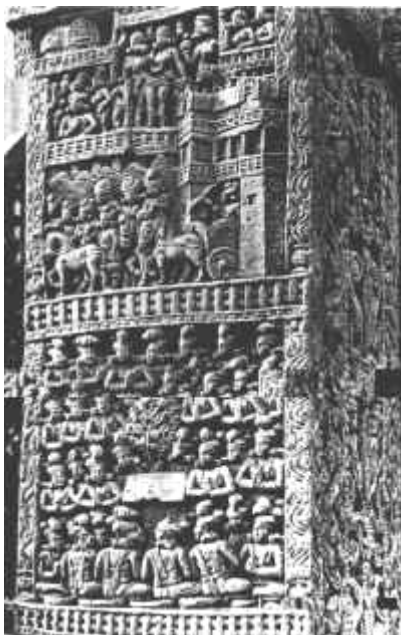
elephant, is the protagonist of these scenes. Although his earlobes are distended, they are devoid of earrings, and his only jewellery is a simple necklet of amulets. His royal status is indicated by the parasol above his head, and the attendant with a chowrie (fly-whisk) accompanying him. He uses a goad to prick the elephant, but this clearly is not a military excursion, for the animal is hobbled. In order that the size of the human figures should remain constant throughout, the animals are all depicted on a smaller scale, particularly the elephant. Behind these mounted figures comes a distinctly separate group of a man and two female musicians, one playing an early harp-like vina and the other a flute. The stubble on the man's head recalls the act of Sakyamuni, who on commencing his spiritual quest, cut off all his hair. In front of the figure is a vegetal form, possibly related to the shrivatsa, an ancient fertility symbol adopted as one of the ashtamangala or auspicious signs of a great man. He is evidently performing a religious ceremony, for he holds in his left hand the important offering of khusha or darbha grass, while gesturing with his other hand towards the other essential elements of the ritual, a water-pot and a dish of food hovering above it. A second globular vase is depicted floating in mid-air behind the first musician. The resemblance in shape between these vessels and the Kulu vase itself, suggests that it may have served a similar ritual function.

"The final scene shows four plumed 'white' horses pulling a chariot similar to the one depicted on the south gate of the Great Stupa at Sanchi (See Hallade and Hinz, 1968, pl.80). This carries the royal figure, again shaded by a

parasol, with the chariot driver on his left and a chowrie-bearer behind, both of whom are female. Three-leaved foliage and fern-like fronds border the upper and lower edges of the scenes which are set against a background of random



punched dots, arrowheads, wheels or chakras, lotus flowers, and cross-hatched buds. The inclusion of so many auspicious symbols evokes the concept of the principal figure as both mahapurusha and chakravartin, a great and universal ruler (See Coomaraswamy, 1927, p.



315). All these figures are barefoot and similarly dressed according to gender. The women are bare-breasted, with

diaphanous skirts tied with a sash around the waist and bound by two parallel bands of short vertical strokes. They each wear a conical pendant in one ear and a discal earring in the other, a variety of necklaces, angles and

anklets, and have elaborately coiled and ornamented headdresses. The men wear a finely pleated dhoti bound by a rolled sash around the waist. A long scarf loosely draped across the chest and over each shoulder, hangs freely down the back. Both the male and female dress correspond most closely to representations on first-century BCE terracottas from Taxila and Ahichchatra stratum V (Ashton, 1947, pl. 4.46; Agrawala, 1948, p.6, no. 12-13, pl. II; p.11, pl.III.27-8; dates stratum VI-V, 100 BC-AD 100)...Since the first horseman and the votary resemble the royal figure, but lack both his necklace and umbrella attribute, it is not clear whether they represent the same person or not...the status of the rider is less definable. The second horseman in contrast exhibits a number of distinctive features not shared by the other male figures: his horse has a large feathery plume, while he wears circular earrings and a stippled shawl with fringed ends. His cross-hatched cap bound by a plain headband appears to be a slightly more voluminous precursor of the type favoured by the Kushans, and worn by Vajrapan in the Kapardin Buddha relief of the year 32 from Ahichchatra (The year 32 of Kanishka I, i.e. second century AD; Rosenfield, figs. 23, 44-5). Although found in a Buddhist context, the principal figure evokes the concept of a universal ruler, which indicates that the vase predates the emergence of the Buddha image. Cast bronze vessels high in tin have been excavated in quantity as far afield as Thailand, where the site of Ban Don Ta Phet has produced bowls with similar incised designs. (Glover, 1989, pp. 31,42, figs. 26-8). However, the close relationship the figures on the Kulu vase share...with the terracottas of Ahichchatra and Taxila suggests for the vessel an origin within the northern areas of the Indian subcontinent, rather than in South-east Asia."(pp. 162-164)



Indian 'ratha' is a category

distinct from merely a 'war chariot'; the word has many semantic expansions during the historical periods

The use of solid wheels and tri-partite planked-wheels to move heavy loads. The tradition of the temple 'ratha' is typically a heavy 'chariot of the gods' with very heavy and solid wheels. That such vehicles are also called 'ratha' is semantically significant. A 'ratha' in the Indian tradition does not necessarily have to be a light-weight vehicle. [See the ratha depicted at Vijayanagar, Vit.t.halasva_min temple; it is a stone processional car of the 16th cent. AD.

Mode of transporting a stone pillar, after a relief from the citadel of Raichur. (Edith Tomory, 1982, A history of fine arts in India and the West, Bombay, Orient Longman, fig. 23, p. 20).

Rathava_hana? A carrying-stand?

One-horned rhinoceros standing on a flat base to which are attached four solid wheels without spokes with two axles. Similar bronze models of other animals were found at this late Harappan site located on the banks of River Pravara, a tributary of the River Godavari. Daimabad, Ahmadnagar, Maharashtra, ca. 2000 BC; bronze, 14.6x24x28.5 cm



(ASI)

The ratha shown on this panel is drawn by two horses and has spoked wheels; a person carrying an umbrella is seen standing on the chariot-box. The horses have harness and bridles.



West pillar, front, lower panels; Above: the four drives of prince Siddha_rtha; Below: the Buddha preaches to the nobles of Kapilavatsu (Shanti Swarup, 1957, The arts and crafts of India and Pakistan, Bombay, Taraporevala's (Fig.9)



The chariot-wheel is shown as the Wheel of Law.

Relief, worship of the Dharma-cakra

(Wheel of the Law): fragment, showing a Vidhya_dhara flying towards the Wheel with his offerings. Along the upper edge there is a border of running lions. This is the upper left hand and central portion of a casing slab of the second tier...Grey marbl. Amara_vati_. 2nd cent. AD [Anand M. Coomaraswam, 1923, Catalogue of the Indian Collections in the Museum of Fine Arts, Boston, Boston, Museum of Fine Arts, Pl. X, 21.1507, page 52)



The chariot is depicted as a weapon, crushing the enemies under the wheels.

Ma_ndha_ta_ in Uttarakuru. Bha_ja_. 2nd cent. BCE. The Maha_bha_rata (Bhi_s.ma Parva, 7.2-11: uttara_h kuravo ra_jan

pun.ya_h siddhanis.evita_h tatra vr.ks.a_madhuphala_ nityapus.paphalopama_h...) and Maha_va_n.ija Ja_taka refer to the land of Uttarakuru as an idyllic region where people live in eternal youth helped by the klpavr.ks.a whihc yielded clothes, ornaments, food, drinks. The King Ma_ndha_ta_ (the cakra symbolizing royalty) vanquished the demons and rendered

them prostrate. The wheels of his chariot move over the bodies of the demons who obstructed his path.



11. Gandhara: Ashoka and Subhadrashakti in Kapilavastu. 1st/2nd c.

representation of Su_rya_, the rising sun crushing the female demons of the night, who sink like clouds. (Vincent Smith, A history of fine art in India and Ceylon, Bombay, DB Taraporevala Sons and co. Pvt. Ltd., Pl. 41)
A spoked-wheeled covered wagon drawn by an equid (?).



12. Gandhara: Subhadrashakti. 1st/2nd c.

Siddha_rta return to Kapilavastu. Karachi. From Rawalpindi. H 7 3/8 in.; w. 10 1/4 in. A man is leading a covered wagon drawn by two horses through a wooded region. Inside the wagon a glimpse of Ma_ya_ is seen. The child is seated on the wagon pole and appears as big

A

as his mother. (Source: Harald Ingholt, 1957, Gandha_ran Art in Pakistan, Pantheon Books, Pl. 17).

Covered wagon with spoked wheels, drawn by bullocks; indication: a possible use in trade to carry goods.

Peshawar. Siddha_rta Fasting. From Takht-i-Bahai, 1908. On the base is portrayed an incident which happened after the illumination: the gift of the two mercants Trapusha and Bhallika. (Note the semant. 'trapus.' means 'tin' in Atharvaveda).



Ma_ya_
and

The ratha has spoked wheels and is drawn by two horses. The chariot has a box where two people are seen standing. The horse harness, rein and bridle are vividly depicted. Siege of



Kus'inagara, South toran.a, Stu_pa I, Sanchi

The chariot drawn by four horses has spoked wheels; the chariot is used as a transport vehicle, transporting three people.



Prasenajit visiting Buddha, S'un:ga, 2nd cent. BC, Bha_rhut, Calcutta, Indian Museum. (Source: C. Sivaramamurti, 1979, *Sources of History illumined by literature*, New Delhi, Kanak Publications, Fig. 8).



Ba_rhu_t Stu_pa. South Gate, Prasenajit pillar. The king is on a chariot drawn by four horses preceded by a mounted guard; he drives to worship the Sacred Wheel. The inscription above the wheel reads: bhagavato dhama cakam, the blessed wheel of the

law. The serpent king Era_pata pays homage to the Blessed One, the inscription below the procession says: **erapato naga raja bhagavato vandate.**

The aerial chariot with spoked wheels and a mighty, solid covered wagon drawn by

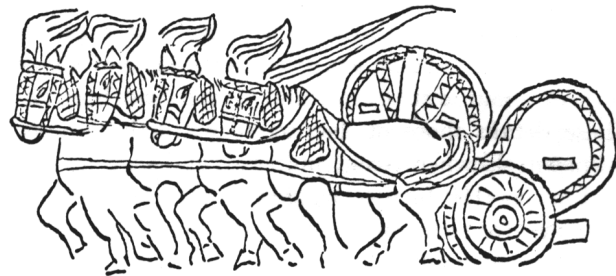
perhaps two horses (only one horse is seen in the sculpture).

Ra_van.a lifts Si_ta_ into the magical vima_na and driving swiftly across the sky.

The depiction is on a niche at the Kaila_sana_tha temple at Elu_ra_, dated to the eighth century AD (Vincent Smith, *A history of fine art in India and Ceylon*, Bombay, DB Taraporevala Sons and co. Pvt. Ltd., Pl. 212) See Heinrich Zimmer, 1955, *The art of Indian Asia*, Bollingen Series XXXIX, Pantheon Books.

The ratha is a carriage drawn by two horses with a necklace of bells; the charioteer is riding on the horse. A number of 'nobles' accompany the carriage (ratha); people bearing leaf fans and umbrellas and some carrying swords are just behind and are followed by ladies. The 'ratha' with spoked wheels here is a precursor to the temple-car platforms but using solid wheels to carry the heavy weight of the wooden superstructure.

First gallery: Above: Queen Ma_ya_ proceeds to the Lumbini_ garden; Below: scene from an unidentified pious tale. (Vincent Smith, *A history of fine art in India and Ceylon*, Bombay, DB Taraporevala Sons and co. Pvt. Ltd., Pl. 481)



sa_nchi ratha. Note the small-sized horses (not, equus caballus; perhaps more like the Tarpan or domesticated Przewalski horses) [Marshall, *The monuments of Sanchi*, vol. II, pls. XI, middle lintel; XV, bottom lintel; XXIII a].

Asses, Mules, Horses, Goats, Antelopes: draught animals for 'ratha' in R.gveda

R.gveda refers to Bhr.gus as chariot-builders (Atharvaveda refers to chariot-builders as rathaka_ra, AV 3.5.6) and associated with the acquisition of fire. Smiths (kavi-s) and carpenters were religious leaders like the Bhr.gu. Piggott notes (Prehistoric India, p. 281): the wheelwright's practice was virtually unchanged for over a thousand years.

It is a reality of the terrain that chariots drawn by horses could NOT have negotiated the Khyber pass without falling apart, and negotiated the rugged hilly tracts in large numbers, as believed by the proponents of 'Aryan' invasion or migration with horses into Bha_rat. At the outset, the use of the term 'aryan' in a class or group context is also of questionable validity and lacks early textual evidence.

It is argued in this page and links, that the term, 'as'va' in the R.gveda and even in later texts can be a reference to the equus species in general, and not necessarily to the *equus caballus* (Arabian horse).

Ass and horse were beasts of burden. (TS 4.1.4.2: sthiro bhava vi_d.van:ga a_s'urbhava va_jyarvan, pr.thurbhava sus.adastvamagneh puri_s.ava_hanah). TS notes that ass is the best burden-gatherer: TS 5.1.5.5, gardabhah pas'u_na_m bha_rabha_ritamo. Dhr.tara_s.t.ra's chariot was drawn by mules and was capable of going 14 yojanas a day. (MBh. 5.84.12, Udyoga Parva). The abduction of Si_ta_ by Ra_van.a was by a chariot drawn by asses. (Ra_m. Aran.ya 49.19).

Battle-cars may be drawn by ra_sabha (RV 1.34.9) or gardabha (RV 3.53.23) or mules (as'vatara: Aitareya Bra_hman.a 4.9.1). A horse is also called va_jin (RV 1.163.5, 1.116.5, 1.130.6).

As'vin = one having a horse. Przyluski notes that As'vins were horse-gods before they became horsemen. (J. Przyluski, Indian Culture, vol. 3, 1936-37, 'Asses, Horses and Gandharvars', p. 617). Pu_s.an's chariot was drawn by goats (aja_: RV 1.162.2, 10.26.8); Marut's chariot was drawn by antelopes (pr.s.ati_: rv 5.55.6). According to Pan~cavim.s'abra_hman.a (1.7.1), the yajama_na wipes the horses' mouths clean with a cluster of darbha grass and addresses them with eight names: as'vo'si, atyo'si, sayo'si, hayo'si, va_jy asi, saptir asy, arva_si, vr.s.a_si. Then an explanation follows how to distribute the names among mares, mules and jenny-mules. After ratha_rohan.a, a horse is led to the a_havani_ya and pu_rvava_h, the lead horse, is let loose towards the north (BS'S 2.17:62.17).

Horse in the Bharatiya tradition

R.gveda 1.162.18 refers to a horse with 34 ribs. The equus caballus generally has 38 ribs. It is possible that the horse used for the as'vamedha was a pony used even today in the ekka-s which ply in the Siwalik region of Punjab-Haryana.

r.s.i: di_rghatama_ aucatthya; devata_: as'vastuti

चतुश्चिलतशद् वाजिनो देवबन्धोर् वङ्क्रीर् अश्वस्य
स्वधितिः सम् एति ।

अच्छिद्रा गात्रा वयुना कृणोत परुष्मपरुर् अनुयुष्या वि
शस्त ॥

1.162.18 The axe penetrates the thirty-four ribs of the swift horse; the beloved of the gods, (the immolators), cut up (the horse) with skill, so that the limbs may be unperforated, and recapitulating joint by joint. [Thirty-four ribs: it is noted that other animals have only 24 ribs; unperforated: अच्छिद्रा_ga_tra_: the vis'asana karta_rah, or dissectors, are to utter the name of the parts, as heart, tongue, breast, as they divide them; and are to so separate them that they may not have holes or perforations, they may not be mangled].

Horse-riders: Maruts ride horses, Indra rides a horse

के छानरः श्रेष्ठतमा य एकमेक आयय ।

परमस्याः परावतः ॥

क्व वो ऽश्वाः क्वाभीशवः कथं शोक कथा यय ।

पृष्ठे सदौ नसोर् यमः ॥

जघने चोद एषां वि सुवथानि नरो यमुः ।

पुत्रकृथे न जनयः ॥

RV 5.061.01 Who are you, most excellent leaders (of rites), who come one by one from a region exceedingly remote?

[A wonderful old story: a_s'caryam pura_vr.ttam a_hura_gamapa_ragah, those who have gone through the a_gamas have related a wonderful occurrence].

5.061.02 Where are your horses? where your reins? what is your capability? where are you going? The saddle is on the back (of the steeds), the bridle in their nostrils.
5.061.03 The goad is (applied) to their flanks; the drivers force them to spread their thighs apart, like women in bringing forth children.

Sa_maveda (1.5.1.5.9) refers to Maruts as warrior horsemen: acirmarya_a_va_jam va_jino agmam devasya savituh savam svarga_m arvanto jayata (the strong youths have come forth to view, to show their strength, God Savitar's quickening energy: ye warrior horsemen, win the heavens').

मां नरः स्वश्वा वाजयन्तो मां वृताः समरणे हवन्ते ।

कृणोम्य् आजिम् मघवाहम् इन्द्र इयमि रेणुम् अभिभ

त्यूजाः ॥

RV 4.042.05 Warriors well mounted, ardent for contest invoke me; selected (combatants invoke) me in battle; I, the affluent Indra, instigate the conflict, and, endowed with victorious prowess, I raise up the dust (in the battle).

नि येन मुष्टिहत्यया नि वृत्रा रुणधामहै ।

त्वोतासो न्य अर्वता ॥

1.008.02 By which we may repel our enemies, whether (encountering them) hand to hand, or on horse-back; ever protected by you. (mus.t.ihatyaya_ = mus.t.ipraha_ren.a) = lit. by striking with the fist; on horseback = with a horse (a reference to infantry and cavalry)].

यमेन दत्तं त्रित एनम् आयुनग् इन्द्र एणम् प्रथमो

अध्य अतिष्ठत् ।

गन्धर्वो अस्य रश्नाम् अंगृष्णात् सूर्याद् अश्वं वसवो

निर् अतष्ट ॥

1.163.02 Trita harnessed the horse which was given by yama; Indra first mounted him, and gandharva seized his reins. Vasus, you fabricated the horse from the sun. [Trita = Va_yu, as pervading the three regions; Yama = Agni; gandharva = Soma; Vasus = demi-gods or personified solar rays; su_ra = a_dityaman.d.ala, the solar sphere].

In Mesopotamia (ca. 1850 BC), it was considered preferable for a king to ride a mule or a chariot, rather than a horse. 'My lord should not ride on a horse. Let my lord ride on a chariot or indeed on a mule, and let him do honour to his royal status.' (Archives Royales De Mari, vol. VI, no. 76, Rev. 22 to 25; HWF Saggs, The Greatness that was Babylon, p. 195. cf. IJ Gelb, JCS XV, 1961, p. 37, n.31; p. 41, n.45).

sadam, horse

परि ते जियुषो यथा धारा सुतस्य धावति ।

रूलतहमाणा व्य अव्ययं वारं वाजीव सानसिः ॥

9.100.04 Your stream when you are effused, swift-flowing bountiful, rushes through the sheep's hair like the horse of a victorious (hero). [The reference to just a single horse, indicates that it was ridden by the hero].

"At Rana Ghundai i the Zhob valley of Baluchistan, teeth of the domesticated horse have been discovered in the deposits of RG I

(Journal of Near Eastern Studies, V, 1946, p. 316), those people bred, besides horses, asses and cattle which were definitely Indian (ibid., p. 311). Ross tells us that they 'had little constructional ability, perhaps no knowledge of metal', and to them even 'the potter's wheel was unknown' (ibid). The evidence of RG I suggests that they were nomadic horse-riding herdsmen who used the site as a camping ground. Clearly, the horse was ridden first and yoked later in the story of its domestication...Bones of the domesticated horse were unearthed at Mohenjodaro, a foot and ten inches deep beneath the surface (Marshall, Mohenjodaro and the Indus Civilization, 1931, vol. II, p. 653; pl. CLXII, fig.9)...Bones of the domestic ass, too, were found at Harappa_, at varying depths. (B. Prasad, MASI, 51, Animal Remains from Harappa, p. 28; cf. Piggott, ed. *The Dawn of Civilization*, p. 157). Further light on the subject is thrown by the discovery at Lothal in Kathiawar of three terra-cotta horses, doubtless representing the domesticated animal. (Indian Archaeology, 1959-60-- A Review, p. 18, pl. XVE). The horse may also be seen in a small terra-cotta fragment (Sankalia, HD, Prehistory and Protohistory in India and Pakistan, Bombay, 1962-63, p. 169 and fn. 51; MG Dikshit, BDCRI, Vol. XI, 1950, p. 51, pl. XVII) and in a stylised painting on pottery from Rangpur (Sankalia, loc.cit, fn. 52; Dikshit, loc.cit., pl. XII, I, p. 41. The design depicts a horse's head with mane according to Prof. Mallowan quoted by Sankalia, even though it has also been erroneously described as a palm 'frond'. Przyluski has argued that names like Satvant, Sa_tvata and Na_satya have a non-Aryan radical sata which appears in the Munda languages in the form of sadam, meaning 'horse'. (Przyluski, 'Hippokoura et Satakarni', JRAS, 1929, p. 273 ff.; Satvant, Sa_tvata and Na_satya, IHQ, IX, 1933, pp. 88-91)...Some breed of the horse or pony (sa_da as in Skt. sa_din = rider) must have been known to the Austric speaking pre-Aryan peoples of India." (Sarva Daman Singh, 1965, *Ancient Indian Warfare with special reference to the Vedic period*, Delhi, Motilal Banarsidass, p. 53).

यत् ते सादे महसा शूकृतस्य पाष्ण्या वा कश्या वा
तुतोद ।

सुचेव ता हविषो अध्वरेषु सर्वा ता ते ब्रह्मणा

सूदयामि ॥

1.162.17 Whoever has goaded you in your paces, either with heel or with whip, whilst nothing in your strength-- all these (vexations) I pour out with holy prayers, as oblation with the ladle. [sa_de = seated-in-the-saddle; cf. AK Coomaraswamy, Horse-riding in the R.gveda and Atharvaveda, JAOS, vol. 62, 1942, pp. 139; 140; cf. TS 4.6.9.2]

The use of the term, sa_de in RV 1.162.17 and sadas in RV 5.61.2 indicate that in AV 10.10.24, sa_dinah may mean, as'va_ru_d.ha_h (mounted on horses): ye rathino ye aratha_asa_da_ ye ca sa_dinah (Whitney: who have chariots, who have no chariots, those without seats and they who have seats...; asa_das = foot-soldiers, as'va_diya_narahita_h pada_tayah).

Citing Kikkuli's Hittite work on horse-trainingText, translation and commentary in: A. Kammenhuber, *Hippologia Hethitica*. , Gurney notes: '...this Aryan clan, moving westwards, brought with them their special knowledge of horse-breeding, and that it was from them that the art was learnt by the peoples of Western Asia.' (Gurney, *The Hittites*, p. 105). 'Wolfram von Soden and H. Kronasser have pointed out that Indian horse-terms are present in the Akkadian text of the Nuzi documents. (cf. Wiener Zeitschrift fur die Kunde des Morgenlandes, vol. LIII, 1957, p. 181 ff.) Vittore Pisani thinks that in some adjectives for the horse, -- babrunnu/paprunnu, b/pinkarannu and zirramannu/zirrannu, -- Sanskrit words such as babhru, pin:gala and ji_ra are recognisable. (ABORI, vol. 39, 1958, pp. 133-134). This constitutes an important association of Aryan associations with Akkad...The Assyrians had a different word for the horse in general, *sisu*, including the chariot or draught horse, as distinct from the cavalry

horse called *pithallu*.' (Sarva Daman Singh, 1965, *Ancient Indian Warfare with special reference to the Vedic period*, Delhi, Motilal Banarsidass, p. 55).

Harivam.s'a (Chapters 91 to 97) include an account of the expedition against the Asura king Vajrana_bha and his killing by the Ya_dava Pradyumna and Sa_mba. Kr.s.n.a performs an as'vamedha in Dva_raka_ when an actor named Bhadra entertains the people with his dramatic performance. Pradyumna is hero, Bhadra is accomplice, Sa_mba is clown, Ya_dava-s are actors; they slip into Vajrana_bha's city as a drama troupe and enact Ra_ma_yan.a, Rambha_'s love, Nalaku_bara and curse of Ra_van.a Vajrana_bha is captured and killed. (cf. V. Raghavan, 1979, *Festivals, sports and pastimes of India*, Ahmedabad, BJ Institute of Learning and Research, p.48).

Va_jimedha is described in the R.gveda (10.52; 10..62.7) and Yajurveda (15.35-45).

समानं नीळं वृषणो वसनाः सं जग्मिरे महिषा
अर्वतीभिः ।

ऋतस्य पदं कवयो नि पान्ति गुहा नामानि दधिरे
पराणि ॥

10.005.02 Great (worshippers), showerers (of oblations) enveloping with their hymns the common dark (fire), have associated (him) with his horses (to come to the sacrifice). Sages preserve (by oblations) the place of the water and support the divine rains in the vault (of heaven). [Have associated him: have (themselves) become possessed of horses; the strong stallions dwelling in one common place have joined the mares; the place of the water: i.e., the fire. guha_ na_ma_ni dadhire para_n.i = they keep in their secret hearts (i.e., worship) Agni's principal names, Agni, Ja_tavedas, Vais'va_nara...]

इन्द्रेण युजा निः सृजन्त वायतो ब्रजं गोमन्तम्
अश्विनम् ।

सहस्रम् मे ददतो अष्टकर्ण्यः श्रवो देवेष्व अक्रत ॥

10.062.07 The acceptors of oblations, with Indra for their associate, have emptied pastures crowded with cows, and horses, giving me a thousand full-grown (cattle), they have gained renown among the gods. [Acceptors of oblations: va_ghatah = priests; bearers or offerers of sacrifices, i.e. An:girasas or the Vis'vedeva_s; full-grown: as.t.akarn.yah = eight-eared, or, broad-eared (from as.t.a, i.e. visti_rn.a); using part of the whole, the phrase is explained: cows having all their members ample].

Nakula in As'vas'a_stra notes that the horses are the means of attaining dharma and artha (Va_jipras'am.sa_dhya_ya.9). Nakula refers to S'a_lihotra, Sus'ruta, Garga as authorities in as'vas'a_stra (Va_jipras'am.sa_dhya_ya.7). Lomas'a advises Yudhis.t.hira to visit S'a_lis'u_rpa, the place of residence or S'a_lihotra, during his pilgrimage. (Maha_bha_rata 3.81.90; Vana Parva, Ch. 71.27; Ch. 83.107). During the exile of the Pa_n.d.ava in the capital city of King Vira_t.a, Nakula was in-charge of caring for the horses. Hemacandra (12th cent.) notes that monkeys were kept with the horses to prevent the latter from catching eye disease. Pan~catantra notes S'a_lihotra's recommendation that monkey's fat be used during the cremation of the horse.

Dr. Shiva Sheikhar Misra, 1982, *Fine Arts and Technical Sciences in Ancient India with special reference to Somes'vara's Ma_nasolla_sa*, Krishnadas Sanskrit Studies Vol. III, Krishnadas Academy, Varanasi notes: "The important works available on the science and treatment of the horses at present are as follows: 1. The chapter on As'avaidyaka in the Agnipura_n.a; 2. Nakula's As'vacikitsa_ and As'vas'a_stra; 3. S'a_lihotrasa_rasamuccaya of Kalhan.a; 4. Hayali_la_vati_ (as referred to by Jayadatta); 5. As'avaidyaka of Jayadatta Su_ri; 6. Yogaman~jari_ of Vardhama_na; 7. As'avaidyaka of Di_pan:kara; 8. Yuktikalpataru of Bhoja; 9. S'a_lihotra of Bhoja; 10. As'va_yurveda of Va_gbhatta; 11. Somes'vara's Ma_nasolla_sa or Abhilas.ita_rthacinta_man.i...The

As'vavaidyaka was translated into Persian in 1381 and it is known by the name Kurbatulmulka. In the time of Sha_hjahan a work on the subject was translated into Arabic under the title Kitabul-Vaivarta. During the British rule an English translation on the subject was published in 1788 in Calcutta. The works on As'vavaidyaka was translated in other languages like Tibetan and Nepalese also....Nakula has given a detailed description of only twenty six types (of horses) (As'vas'a_stra Kulalaks.an.a_dhya_ya.10). According to King Somes'vara, there are sixty five types of horses out of which thirty nine varieties are well known while twenty six types are rather unknown. The thirty nine known types described by him are as follows: ka_mboja, yavana, teji_, ba_hli_ka, ca_tala, tokkha_raka, sakeka_n.a, podda_ra, ka_ndaleya, yaudheya, va_japeyaka, vana_yuja, pa_rasi_ka, ka_ndha_ra, pa_rvateya, ka_s'mi_ra, sa_rasvata, gurjara...King Somes'vara has also classified horses on the basis of caste distinction, viz. bra_hman.a, ks.atiya, vais'ya and s'u_dra...the hair of the bra_hman.a type of horse are white...vipra type of horse is ka_ka...vais'ya type of horse as sera_ha which possesses golden hair... King Somes'vara has given a detailed description of the form and size of the limbs, which is more or less similar to the description given by Nakula, differing only in minute details. (Ma_nasolla_sa 4.4.715-30)."(pp. 183-184).

pr.s.t.ha (back), a_sana (centre of the back), nibaddha (shoulder blades and the hump), ba_hu (fore-arm); kin.a (portion in the middle of the shoulders) are described as follows (as'vas'a_stra. Prades'a_dhya_ya, 3-29):

tatah pr.s.t.ham vija_ni_a_da_sanam
pr.s.t.hamadhyagam
amsakau kakudam caiva nibaddhau
pariki_rtitau
sya_ta_mamsa_dadho ba_hu_tayorba_hye
s.ad.an:gule
ba_hvorabhyantaram vidya_t kin.am
ca_tiprasiddhakam

Sauptika parvan (118.13) refers to the people of Ka_mboja as fine horsemen (syandanes.u ca kamboja_yukta_parama-va_jinah). Va_kpati (Gaud.avaho, p. 78, v. 261) notes that the horse



was a product of the Himalayan regions^{vi}:
hima selanta sambhava_. "Ba_n.a tells us that the royal stable of emperor Hars.a was filled with horses 'from Vana_yu, A_rat.t.a, Ka_mboja, Bharadva_ja, Sindh and Persia. (pavanodbhu_ta)'. (cf. PC Chakravarti, 1941,

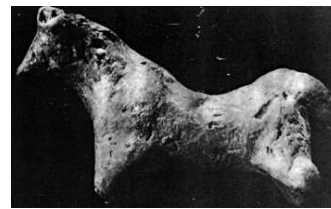
The art of war in ancient India, repr. Delhi, Low Price Publications, pp. 37-46).

Presence of the equus, horse in Sarasvati Civilization



Lothal. Terracotta horse (c. 2250 BC)

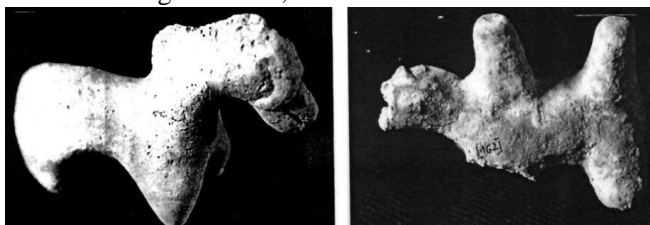
Lothal. Horse. Terracotta ; Chessmen. Terracotta. Note the four pieces on the second row from top; they look like horse-heads. [After Pl. CXVII and CXX in SR Rao, 1973, *Lothal and Indus Valley Civilization*, Delhi, Asia Publishing House]



The presence or absence of the horse and chariot in archaeology and ancient texts of Bharat has been

a subject of continuing interest for over 150 years. This section of the website is devoted to the presentation of arguments in this regard. Scholars are welcome to make their contributions to this topic. The subject on chariots has been dealt with elsewhere on the website.

It is not mere poetic fancy that the steeds of the ratha of the as'vins are not a pair of *equus caballus* but gardabha-s, asses. The horse race



is won by the as'vins. The horse, ass and onager were apparently viewed, in R.gvedic times, as belonging to the 'equus' species. It is known that the early chariots of Mesopotamia were drawn by onagers.

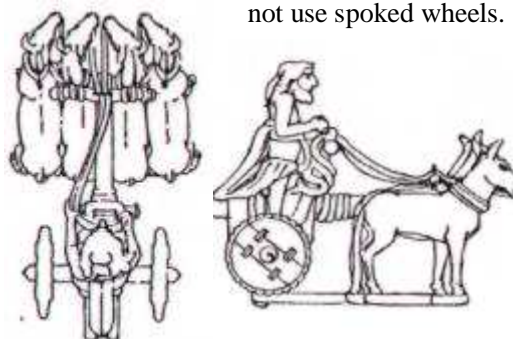
Terracotta figurines. Horse, ca. 1600 BCE; bactrian camel, ca. 1400 BCE. Evidence for the introduction of the animals to the Indus region; in later levels of Pirak, the horse figurines are painted with elaborate trappings and have attached wheels to be used as movable toys. [JM Kenoyer, 1998, p. 177]. Pirak, Kachi plain, Baluchistan.

Nausharo. Onager (*equus hemionus*) figurine. 2300 to 2200 BCE. Nausharo. NS 91.02.33.01; Dept. of Arch, Karachi; Harappa Museum, H88-864. "One other (apart from tiger) wild animal that was rarely depicted in figurines of the Indus is the onager (*equus hemionus*), a species of wild ass that was common along the desert fringes of the Indus Valley and is still found in parts of Gujarat and Sindh. While this animal may have been

hunted, it was not tamed for use in transport or farming. We have no evidence for the use of domestic horse (*equus caballus*), donkey (*equus asinus*) and Bactrian two-humped camel (*camelus bactrianus*) by the Indus people even though they were used in Central Asia and parts of Afghanistan. Nomadic communities or traders may have occasionally brought such exotic animals to the hot plains, but they were not adopted for transport until after the decline of the Indus cities." [After Fig. 8.47 in JM Kenoyer, 1998, p. 167].

The chariots had evolved from solid-wheels to bi-partite and tri-partite wheels to four-spoked wheels and then six-spoked wheels in the 4th-3rd millennia BCE and the technology seems to have radiated out of this civilization area. The presence of inscriptions with pictorial motifs depicting spoked-wheels, chariot-boxes and the archaeological finds of chariot-boxes made as copper models (Chanhudaro) indicate that the technology was in vogue in the Sarasvati-Sindhu civilization area ca. 3500 BCE.

Carts in contemporary Mesopotamia also did not use spoked wheels.



[Copper model of a chariot with four onagers harnessed abreast, from Tell Agrab, Mesopotamia; 3rd. millennium BC; the stand has been removed in the top view presented on the left.] In Mesopotamia, the under-carriage consisted (to judge from those of the hearses found at Kish and Ur) of a single plank, 45 to 56 cm. wide, perhaps attached to the axle-tree by straps; perhaps, the axle turned with the wheels.

In the case of four-wheeled wagons there is no evidence at all that the front axle was an independent pivoted bogie. Sumerians employed the onager (*Equus onager* Pallas), yoked in the manner of oxen to draw war chariots and passenger vehicles. Note the quiver with spears carried on the wagon and vanquished soldier crushed under the onagers. "It is most unlikely that horses were first domesticated or yoked to chariots in Mesopotamia, for the wild equid to be expected in that area was the onager, which had in fact been tamed there by 3000 BCE. It is true that a single pictographic tablet of about that date contains the sign, compounded of 'ass' and 'mountain', that a thousand years later was to be regular cuneiform ideogram for 'horse'... Wild horses (*Equus caballus*)--essentially steppe dwellers-- have existed in northern Eurasia... The earliest convincing representations of equids drawing cars with spoked wheels occur on cylinder-seals from Hissar in north-east Persia (2000+-200 BC) and from Cappadocia (1950-1850 BC). There are written references to horse-breeding at Chagar Bazar on the Khabur by 1800 BCE..." (V.Gordon Childe, 1954, *Wheeled Vehicles*, in: Singer et al, opcit, pp. 718ff.) [cf. Sharma's notes on the horse bones (*Equus Caballus*) found in Surkotada, in a domesticated setting, Sarasvati-Sindhu valley.]

The *equus sivalensis* seems to be a breed distinct from the *equus caballus* and the horse or as'va described in the R.gveda may refer to *equus sivalensis* with 34 ribs, a smaller-sized horse compared to the Arabian species. Whether this is relatable to the species *equus agilis* is also a subject matter for further scientific investigations.



Equus sivalensis

Close to Parus.n.i., in the Markanda valley, a lot of faunal remains, dated as early as to the

Pleistocene period, have been recovered from the Upper Siwaliks in general and the neighbouring areas in particular. Mention has been made of frequent occurrence, about 2.48 million years ago, of *stegodon insignis* ganesa, *archidiskodon planifrons*, *elephas hysudricus*, *equus hysudricus*, *equus sivalensis*, *rhinoceros sivalensis*, *R. palaeoindicus*, *Sus spp.*, *camelus sivalensis*, *cervus spp.*, *colossochelys atlas*, *geoclemys sivalensis*, *crocodylus spp.* and a host of other new forms (Badam, G.L., *Pleistocene Fauna of India*, Pune, Deccan College; SN Rajaguru and GL Badam, *Late Quaternary Geomorphology of the Markanda Valley, Himachal Pradesh*, in: BP Radhakrishna and SS Merh, eds., *Vedic Sarasvati*, 1999, Bangalore, Geological Society of India, p.149).

"Pliocene The genus *Equus* appeared in early Pliocene of Northern America; around 2.5 My ago it dispersed to Asia (*E. sanmeniensis*, *E. sivalensis*, *E. namadicus*), Europe (*E. stenonis*, *E. livezovens*) and then Africa (*E. koobiforensis*). A later invasion brought to Eurasia *E. hemionus* and *E. caballus*. *Equus* also dispersed in the middle and late Pleistocene into Southern America. With the exception of Australia and Antarctica, it had a worldwide distribution and survived undisturbed until about 10,000 years ago, when overhunting by prehistoric men brought it to a drastic reduction in Eurasia and to extinction in the Americas, where it was reintroduced in post-Columbian times".
http://www.unifi.it/unifi/msn/geopal/route/eqfr_eng.htm

"Species of the Equidae family found associated with the Hominid skull is *Equus namadicus*. It is either closely related¹² to Lower Pleistocene *E. sivalensis* or inseparable¹³⁻¹⁵ from that. *E. namadicus* also shows resemblance to Late Villafranchian *E. stenonis* of Europe and Central China¹⁶. This *E. namadicus* was subsequently replaced by *E. hemionus khur* during the Upper Pleistocene."
http://www.iisc.ernet.in/~currsci/august/articles_21.htm " Antiquity of the Narmada Homo

erectus, the early man of India" Arun Sonakia* and S. Biswas Palaeontology Division, Geological Survey of India, Nagpur 440 006, India

Long period of domestication of Rana Ghundai horse prior to 3500 BCE

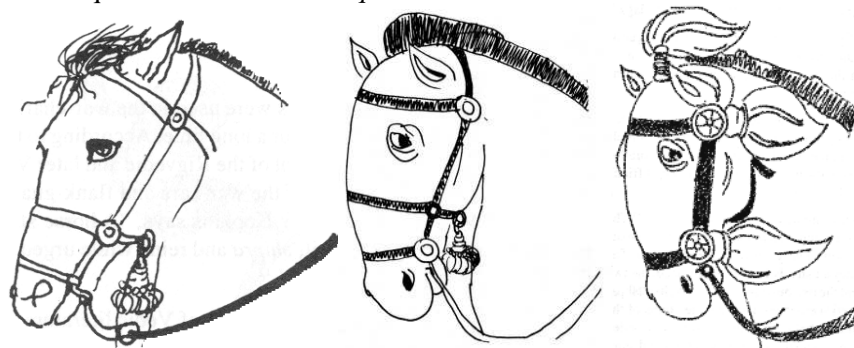
Horse-rider, Bha_rat, 13th cent. AD



Orissa. 13th cent. AD. Ivory carvings.. Four views of a leg of a throne made of ivory.

1. A caparisoned horse; a hunter shooting at a deer with his bow.
2. Rear view of the first plate. A bow is slung around the cavalier's left hand; a tarkash, filled with arrows is tied to his back. He carries a circular shield.
3. Side view of the leg of the throne.
4. Lower part depicts a hunter shooting at a deer with his bow. A quiver, filled with arrows, is tied to the waist of the hunter.

This exquisite ivory carving is comparable to the carvings in stone on temple walls all over Bharat, for example the images of horses on Sa_n-ci stu_pa of 2nd cent. BCE and the painting in an Ellora cave, demonstrate the profile of the indigenous pony, short-statured horse comparable to *Equus Sivalensis*, a breed quite distinct from the *equus caballus* or the Arabian horse:



Sa_n-ci. stu_pa. 2nd cent. BCE. Sculptures on north toran.a



A spike behind the jaw replaces the horse-bit, hence the use of three bands on the headstall. When a bit is used, Sa_n-ci sculptures show only two headbands in the headstall.

Barhut. S'un:ga. 2nd cent. BCE. Stone medallion depicting a scene from Buddha's life.



A bridled horse with a saddle (blanket on his back) (ASI, New Delhi). The horse is a short-statured horse, indigenous to Bha_rat.

The profile of the horse-head is vivid, fully-reined with horse-bit and harness. Pratiha_ri witnessing Suddhodana's lament

together with Chandaka, the horse-groom. Nagarjunakonda, 3rd cent. AD. After Pl. XII in SP Tewari, 1987, *Royal attendants in ancient Indian literature, epigraphy and art*, Delhi, Agam Kala Prakasha

Chess piece. Horse, Konda_pur, 2nd to 3rd cent. CE. Terracotta. 6.7 cm. High. Govt. Mus., Hyderabad [After Ashton, L. ed., 1950, *The art of India and Pakistan – A commemorative catalogue of the exhibition held at the Royal Academy of Arts, London, 1947-8*, London.] The game of chess is also attested in Bha_rhut stu_pa. Bha_rhut, 2nd cent. BCE. After Coomaraswamy, AK, 1956, *La sculpture de Bharhut*, Paris, Pl. XLVIII, Fig. 223].



Chess piece Chariot from Ma_ntai (Srilanka), ivory, 1.7 cm.

High. After Arch. Mus. Anura_dhapura, Mus. No. 67. [J. E Van Lohuizen de Leeuw, A unique piece of ivory carving – the oldest known chessman, in: in B. Allchin, ed., *South Asian Archaeology*, 1981, Cambridge]. As.tapa_da is a racing game with dice; this developed into Caturan:ga and is attested in Indian literature as early as the 5th cent. BCE. (HJR Murray, 1962, *A History of Chess*, 2nd edn., Oxford].



attle scene. Most of the warriors are painted in red blood colour. A swordsman with a garland swaying on his chest, leads the charge of the brigade. His hair crop is bound in a ribbon band. The diagonal thrust of his sword across the backline of the buffalo he rides is clear. Infantry and cavalry follow. Horses are painted in light yellow and brown. Large ear-rings, tightly tied hair tops and large shields are seen. North beam of the Kailasa western porch, ca. 12-13th cent. AD.

A fossil has been discovered from the Siwalik hills (Himalayan foothills): with short-pillare teeth and find limbe the horse is 15-hands long and perhaps date back to the stone age. (J.C.Ewart, Animal remains, in J.Curle, *A Roman frontier post and its people (The Fort of Newstead)*, Glasgow: J. Mackehose and Sons, 1911, Appendix II, pp. 364,368). E.J. Ross reported the discovery of bones scattered over an area of about 40 ft., of a domesticated horse in the lowest level of Rana Ghundai I, close to Mohenjodaro and Gandhara (pre-Harappan, contemporary with Hissar IA, Susa B and Middle Uruk in Iraq, assigned to ca. 3500-3400 B.C.) in a chalcolithic site of Northern Baluchistan. 'It should be noted, however, that these remains are not, as might be expected, those of small pony-like animals. The teeth were well examined by an expert veterinary officer before their dispatch to the Archaeological Department and he assured us that they are indistinguishable either in structure or in size from those of our modern cavalry horses. This points to a very long previous period of domestication'. (E.J. Ross, Rana Ghundai, a chalcolithic site in Northern Baluchistan, *Journal of Near Eastern Studies*, 5, 1946, pp. 284-516; R.H. Dyson, Problems in the relative chronology of Iran 6000-2000 B.C. in R.W. Ehrick, *Chronologies in old world*

archaeology, Chicago, Univ. of Chicago Press, 1965, pp. 215-50).

Pura a_yasi_: metallic forts: archaeological and textual evidence

अच्छिद्रा सूनो सहसो नो अद्य स्तोतृभ्यो मित्रमहः

शर्म यच्छ ।

अग्रे गुणन्तम् अलतहस उरुष्योर्जो नपात् पूर्भिर्

आयसीभिः ॥

(nodha_gautama) 1.058.08 Son of strength, favourably-shining Agni, grant to your worshipper on this occasion uninterrupted felicity; offspring of food, preserve him who praises you from sin with guards of metal.

तस्मै तवस्यम् अनु दायि सन्नेन्द्राय देवेभिर् अर्णसातौ

।

प्रति यद् अस्य वज्रम् बाहोर् धुर् हत्वी दस्युन् पुर

आयसीर् नि तारीत् ॥

(gr.tsamada (a_n: girasa s'aunahotra pas'ca_d) bha_rgava s'aunaka) 2.020.08 Vigour has been perpetually imparted to Indra by his worshippers (with oblations), for the sake of obtaining rain; for which purpose they have placed the thunderbolt in his hands,

wherewith, having slain the Dasyus, he has destroyed their metal cities.

गर्भे नु सन्न अन्व ँषाम् अवेदम् अहं देवानां

जनिमानि विश्वा ।

शतम् मा पुर आयसीर् अरक्षन् अघं श्येनो जवसा

निर् अदीयम् ॥

(va_madeva gautama) 4.027.01 Being still in the germ, I have known all the births of these divinities in their order; a hundred bodies of metal confined me, but as a hawk I came forth with speed. [i.e., until the sage comprehended the differences between the body and soul, and learned that soul was unconfined, he was subject to repeated births; but in this stage he acquired divine knowledge, and burst through the bonds with the force and celerity of a hawk from its nest; va_madeva s'yena ru_pam a_stha_ya garbha_d yogena nihsr.tah = Va_madeva, having assumed the form of a hawk, came forth from the womb by the power of Yoga (Ni_timan~jari)].

“Baluchistan: Copper occurs widely in Baluchistan...The Chagai region has three areas of occurrence: Ras Koh in Kharan and Lar Koh, both with chrysocolla (oxide ore with 36% copper content) as the ore-type, and the areas of Robat Koh, Malik-i-Siah Koh and Saindak Koh where there is carbonate of copper in some veins (Buller 1906: 127-29). **The extensive presence of slag can be inferred from the fact that at Robat a small fort was built with copper slag as the principal building material.** If Buller's record is to be believed, pre-industrial copper smelting was practiced in Chagai till the last quarter of the 19th century. On the other hand, some slag specimens from the Sandak mines of the area are dated around 3500-3000 BCE.” [Dilip K. Chakrabarti and Nayanjot Lahiri, 1996, *Copper and its alloys in ancient India*, Delhi, Munshiram Manoharlal, p.13; Buller, H., 1906, *Baluchistan District Gazetteer Series IV and IVA. Bolan and Chagai*, Karachi] The fort built of copper slag evokes the R.gvedic description of **pura a_yasi_(metallic forts).**

A.K.Sharma, The Harappan horse was buried under the dunes of..., in *Puratattva*, Bulletin of the Indian Archaeological Society, No. 23, 1992-93, pp. 30-34]: "At Surkotada the bones of the true horse (*equus caballus* Linn.) identified are from Period IA, IB and IC. (radiocarbon dates: 2315 B.C., 1940 B.C. and 1790 B.C respectively). With the correction factors, the dates fall between 2400 B.C. and 1700 B.C... In 1938 Mackay (FEM, Vol. I, p. 289) had remarked on the discovery of a clay model of horse from Mohenjodaro. 'I personally take it to represent horse. I do not think we need be particularly surprised if it should be proved that the horse existed thus early at Mohenjodaro'. About this terracotta figurine Wheeler wrote: (Indus Civilization, Cambridge, 1968, p. 92): 'One terracotta from a late level of Mohenjodaro seems to represent a horse, reminding us that the jaw bone of a horse is also recorded from the same time, and that the horse was known at considerably early period in northern Baluchistan ... It is likely enough that camel, horse and ass were in fact all familiar feature of the Indus caravans.'... appearance of true horse from the neolithic sites of Koldihwa and Mahagara in Uttar Pradesh..." (Note: camel is also not depicted on Harappan inscriptions) The identification by Sharma has been endorsed by Prof. Sandor Bokonyi, Director of the Archaeological Institute, Budapest, Hungary (an archaeozoologist); he wrote in a letter dated 13 Dec. 1993 to the Director General of the Archaeological Survey of India: "Through a thorough study of the equid remains of the prehistoric settlement of Surkotada, Kutcha, excavated under the direction of Dr. J.P. Joshi, I can state the following: The occurrence of true horse (*equus caballus* L.) was evidenced by the enamel pattern of the upper and lower cheek and teeth and by the size and form of incisors and phalanges (toe bones). Since no wild horses lived in India in post-Pleistocene times, the domestic nature of the Surkotada horses is undoubtful. This is also supported by an intermaxilla fragment whose incisor tooth

shows clear signs of crib biting, a bad habit only existing among domestic horses which are not extensively used for war."

"Perhaps the most interesting of the model animals is one that I personally take to represent a horse.' (Mackay 1938, vol. I, p. 289; vol. II, pl. LXXVIII). Lothal has yielded a terracotta figure of a horse. It has an elongated body and a thick stumpy tail, mane is marked out over the neck with a low ridge. Faunal remains at Lothal yielded a second upper molar. Bhola Nath of the Zoological Survey of India and GV Sreenivasa Rao of the Archaeological Survey of India note (S.R.Rao, 1985, p. 641): 'The single tooth of the horse referred to above indicates the presence of the horse at Lothal during the Harappan period. The tooth from Lothal resembles closely with that of the modern horse and has pli-caballian (a minute fold near the base of the spur or protocone) which is well distinguishable character of the cheek teeth of the horse.' "However, the most startling discovery comes from the recent excavation at Nausharo, conducted by Jarrige et al. (in press). In the Harappan levels over here have been found clearly identifiable terracotta figurines of this animal." (Lal, 1998, opcit., p. 112).

R.gveda refers to three types of horses: va_ji, race horse (107 citations), arvan, steed (98 citations), as'va, vaulting horse (11 citations). Another term used for horse is: atya. (aratha_ ayukta_ atya_so, the fast horses without chariots and unyoked: RV 9.97.20).

A Hurrian text from Yorgan Tepe uses Indic words to describe the colour of the horses, for example, babru (Indic babhru 'brown'), parita (palita 'grey') and pinkara (pingala 'reddish'). The Mitanni charioteer is called marya (Indic-Vedic marya 'warrior, young man'). Added to these are a series of names of the noblemen or aristocracy of Mitanni which are clearly Indic. The conclusions are: "an element of Indic-speaking chariot warriors superimposed themselves on a native Hurrian-speaking

population to form a ruling dynasty that endured for several centuries...there are also possible (though disputed) Indic traces in the names of a few gods revered by the Kassites (Surias and Marytas: i.e. Su_rya and Maruts)...By the thirteenth century the Mitanni kingdom collapses which sees an end to the Indic presence in Southwestern Asia..." (Mallory, J.P., 1989, *In Search of the Indo-Europeans*, London, p. 38).

There is evidence for the development of a science of the horse, the as'vas'a_stra in Bha_rata as may be seen from the texts dated to c. 12th century AD mentioned in the following excerpts:

"Veterinary science: (A) As'vas'a_stra or the Science of Horses..."

"Nakula, the reputed author of As'vas'a_stra or the Science of horses, says that the horses are the mean sof attaining Dharma and Artha (As'vas'a_stra--Va_jipras'am.sa_dhya_ya 9)...Horses are the very life and soul of battle. Without them the army is, as it were, the night without moon and a devoted wife without a husband (ibid., 12,13)...They can work in all seasons and can live without food and water for days together. (ibid., 31).

"The importance of the horses was widely recognised in the twelfth century. This is evident from the two works of the period, viz., Ma_nasolla_sa of the Ca_lukyan King Somes'vara III of the early twelfth century and the Harihara-caturan:ga of Goda_vara Mis'ra of the later part of the same century...King Somes'vara... is of the view that the trained horses can form a good division of an army. (Ma_nasolla_sa: 2.6.573)...

"Goda_vara Mis'ra...agrees with Nakula and Somes'vara that one gets land glory through the horses. (Nakula: As'vas'a_stra-Va_jipras'am.sa_, 10; Somes'vara-Abhilas.it.: 1.2.578; Hariharacaturan:ga: 3.6). Later, Hemasu_ri, a Jain author of the 14th century

AD, wrote his well-known treatise 'As'vas'a_stra' dealing with the science of horses...

"The As'vas'a_stra of Nakula mentions the names of S'a_lihotra, Sus'ruta, Garga and other great sages as the first authors on the science of horses...

"The Pan~catantra refers to S'a_lihotra and recommends the use of monkey's fat at the time of the cremation of the horse. We get references in Sanskrit literature according to which monkeys were kept along with horses. For instance, there is a statement in Ka_dambari that monkeys were sent along with the forces of Candra_pi_d.a so that the horses may not suffer from any disease. (Ka_dambari- Uttarabha_ga). Hemacandra, an author of the twelfth century, says that the purpose of keeping monkeys along with horses was to prevent the latter from catching eye troubles. (Dvya_s'raya Ka_vya)...

"The As'vavaidyaka was translated into Persian in 1381 and it is known by the name Kurbatulmulka. In the time of Shahjahan a work on the subject was translated into Arabic under the title Kitabul-Vaivarta. During the British rule an English translation on the subject was published in 1788 in Calcutta. The works on As'vavaidyaka were translated in other languages like Tibetan and Nepalese also..

"Classification of horses. The horses were classified according to the regions and the countries to which they belong; according to the quality or character; according to their chief characteristics which are mainly eight in number: 1. a_varta; 2. varn.a; 3. sattva; 4. cha_ya; 5. gandha; 6. gati; 7. svara; 8. a_ka_ra; the horses may also be classified as auspicious and inauspicious...Nakula divides horses into different families or types...he enumerates fifty four families of horses which are as follows: 1. ka_mboja, 2. ba_lhi_ka, 3. vana_yuja, 4. ga_ndha_ra, 5. a_rat.t.a, 6. va_heya, 7. saindhava, 8. taittika, 9. kulaja, 10.

upakulaja, 11. mecaka, 12. upamecaka, 13. kaivarta, 14. a_rjuni_ya, 15. parvati_ya, 16. yaudheya, 17. yavana, 18. hrasvaya_vana, 19. tus.a_ra, 20. ka_dareya, 21. pa_rvati_ya, 22. a_vantya, 23. ka_s'mi_ra, 24. saka_nana, 25. pa_rvatya, 26. uttara, 27. ma_dreya, 28. da_ks.in.eya, 29. antaradvi_podbhava, 30. kaikeya, 31. ambas.t.ha, 32. va_santika, 33. sauvi_ra, 34. da_rada, 35. sairika, 36. kaira_ta, 37. ks.udra kaira_ta, 38. ma_lava, 39. vindhyaka, 40. ka_lin:ga, 41. ma_dhura, 42. ma_nava, 43. kaus'alya, 44. a_rjuneya, 45. upa_vr.ttika, 46. saura_s.t.ra, 47. sauvi_ra, 48. kauraveya, 49. pa_n~ca_la, 50. paund.raka, 51. kukkut.a, 52. hrasva kukkut.a, 53. haimavata, 54. ma_gadha (there seems to be a duplicate entry of sauvi_ra, nos. 33 and 47)...

"Nakula classifies horses under three heads according to their character (As'vas'a_stra-Sattvalaks.an.a, p. 52). They are: 1. sa_ttvika, 2. ra_jasa, 3. ta_masa...

"A_varta. Nakula defines a_varta as a circular hairy formation on the body of the horse. It is like the pieces of grass made circular in a whirlwind. (p.235). He mentions eight types of a_vartas namely: 1. a_varta, 2. s'ukti, 3. san:gha_ta, 4. mukula, 5. avali_d.haka, 6. s'atapadi, 7. pa_duka_rdha, 8. pa_duka...

"Nakula recognises white, black, red and green as pure colours (As'vas'a_stra-varn.alaks.an.am, 2). Some'svara, on the other hand, recognises white, black, red and yellow as the pure colours. (Ma_nasolla_sa 4.682)...

"Gati or the trot of the horses. S'ukra mentions those horses as good which put their feet by raising them high and those horses which have the bearing of elephant, tiger, peacock, swan, tittira, pigeon, deer, camel, monkey and the bull. (S'ukrani_t.: 4.50.51)...

"S'a_lihotra Vais'ampa_yani_ya or Sa_rasindhu gives a description of the psychology of the horses (as quoted by Nakula's As'vas'a_stra, p. 131). According to it, the horse possesses the following qualities: 1. bhi_ti (fear), 2. ha_sya

(laughter), 3. ca_n~calya (fickle nature), 4. prahars.a (extreme pleasure), 5. dhairya (patience), 6. kopa (anger), 7. dukha (sorrow), 8. hes.ita (neighing), 9. utsa_ha (enthusiasm), 10. lajja_ (modesty), 11. krayas'akuna or good sign for sale...

"Training of the horse...King Somes'vara laid stress only on the training of the wickes horses. (Ma_nasolla_sa: 4.4.743). Nakula...the training should be imparted before dawn...King Somes'vara...says that the wicked horses should be controlled by different methods and weapons. (Ma_nasolla_sa: 4.4.743)...

"Qualifications of trainer...S'ukra (S'ukrani_ti: 2.34-35) says that only such persons should be appointed to train the horses who knows the strength of the horse and is capable of imparting training to them according to season. He should have the knowledge of eleven types of gatis or trots of the horses which are as follows: 1.cakrita, 2. recita, 3. valgitaka, 4. dhaurita, 5. a_pluta, 6. tura-, 7. manda, 8. kut.ila, 9. sarpan.a, 10. parivartana and 11. a_skandita...

"Anatomy of horses...Nakula described seventy four limbs of the horse and their position in the body. (As'vas'a_stra: prades'a_dhya_ya: 3.29). [There is no mention of the number of ribs, there is a general reference to ka_kasa, i.e. the sides of the hump, kakuda, the hump, pr.s.t.ha, the back, a_sana, the centre of th ebac, nibaddha, the shoulder blades and the hump, kin.a the middle of the shoulders)]...

"The most authoritative work which is now available on the treatment of the horses is Jayadatta Su_ri's As'vavaidyaka...Bhoja...points out that the body of the horse contains seventy two thousand veins and eight outlets through which the blood can be let out. (S'a_lihotra: S'l. 81)..." (Dr. Shiva Sheikhar Misra, 1982, *Fine arts and Technical sciences in Ancient India with special reference to Somes'vara's Ma_nasolla_sa*, Varanasi, Krishnadas

Academy (Krishnadas Sanskrit Studies, Vol. III), pp. 180 to 214).

"Extracts from Malladeva Pan.d.ita's S'a_Rasindhu: ...Measurement of limbs of horses. The length-- from one end to the other of the mouth and of upper lip, eye-brows and armpits must be: four inches; that of hump, tip of nose, eyelids, navel and eyes must be: three inches; that of manya_, chin and the cuve at the hip joint must be: two inches; tha tof top of the head and ears must be: six inches; that of nose bund, the lower neck and the jaws must be: sixteen inches; that of sides must be: thirty inches; that of forehead must be: twelve inches; that of ko_s.t.ha must be: twenty inches; that of tongue must be: thirtytwo inches; that of heart must be: three inches; and that of thrat must be: seven inches. These measurements apply to a good horse. If any horse is short by about a quarter of these measurements, it is a medium-sized horse. A horse shorter than this is not commendable.S. Gopalan ed., 1952, *As'vas'a_stram by Nakula with coloured illustrations*, Tanjore, Tanjore Saraswati Mahal Series No. 56, pp. 230-231.

Scientific evidence for an equidae with 34 ribs and equus sivalensis (Horses of the Sivalik range of mountains)

Equus caballus, equus sivalensis, caspian breed, shetland pony -- all belong to the equidae species.

R.gveda refers to a horse with 34 ribs.

Many horses shown on sculptures and, paintings (Ajanta) of the historical periods of Bha_rata, show short-statured horses (almost like Przewalski horses but with pronounced poll or forelocks).

Is there scientific evidence for a horse with 34 ribs? Yes.

There are living horses with 17 pairs of ribs. This is conclusive evidence that there was a

genus among equidae which had 17 pairs of ribs, on thoracic vertebrae. Here is a note from an expert in palaeobiology who notes that it is possible that atleast some hipparions had 17 pairs of ribs. A horse's first pair of ribs are stouter and slightly differently shaped than the other bones and there is a possibility that this pair of the ribcage was left out of the count. But, given the paleontological evidence and the existence of a living genus with 17 pairs of ribs, there is no reason to doubt the veracity of the count mentioned in the R.gveda r.ca.

This establishes with reasonable certainty that the statement in the R.gveda r.ca 1.162.18 is scientifically correct.

Some however claim that the name of *equus sivalensis* should correctly be named *E. caballus pumpelli* or *Hipparion sivalensis*, a genus which survived in northern India quite late in the Pleistocene. "Equus sivalensis" is just a way to say "horse of the Siwalik hills" in Latin. Whether it is *equus sivalensis* or *hipparion sivalensis*, it is possible that many horses of this genus had 17 pairs of ribs of thoracic vertebrae.

Living species of horses with 17 pairs of ribs: a scientific, palaeontological perspective

The number of ribs in mammals corresponds to the number of thoracic vertebrae. **For horses, the usual number is 18 thoracic vertebrae, and therefore 18 pairs of ribs (36 ribs in all). Some living horse have 19 thoracic vertebrae (and hence 38 ribs), and rarely 17 has been recorded too (and hence 34 ribs). We have a quarter horse mounted in our gallery with 18 pairs of ribs, and a Shetland pony mounted with 17 pairs of ribs. So there is variation even in the living species.**

This number of thoracic vertebrae seen in horses is somewhat higher than that seen in most other mammals: humans, cats, dogs, deer and many rodents have 13 thoracics, most

weasels have 14, most seals have 14 or 15, the blue whale has 16. I have looked at diagrams of mounts of fossil horses in books and in our gallery, and most seem to have 18, until you go back into the earliest horses, where there seems to be a few less, but **different mounts seem to vary on this number**. All fossil horses going back at least 20 million years or so seem to have 18 thoracics and therefore 18 pairs of ribs. So I would guess that this increase in vertebral count happened very early in horse evolution, and the number seems to have been pretty stable since then. Therefore the hipparions and other fossil horses you mention should have had 18 pairs of ribs.

Although **knowing that even in the living horse there is variation, then it is also quite possible that at least SOME hipparions had 17 pairs of ribs.**

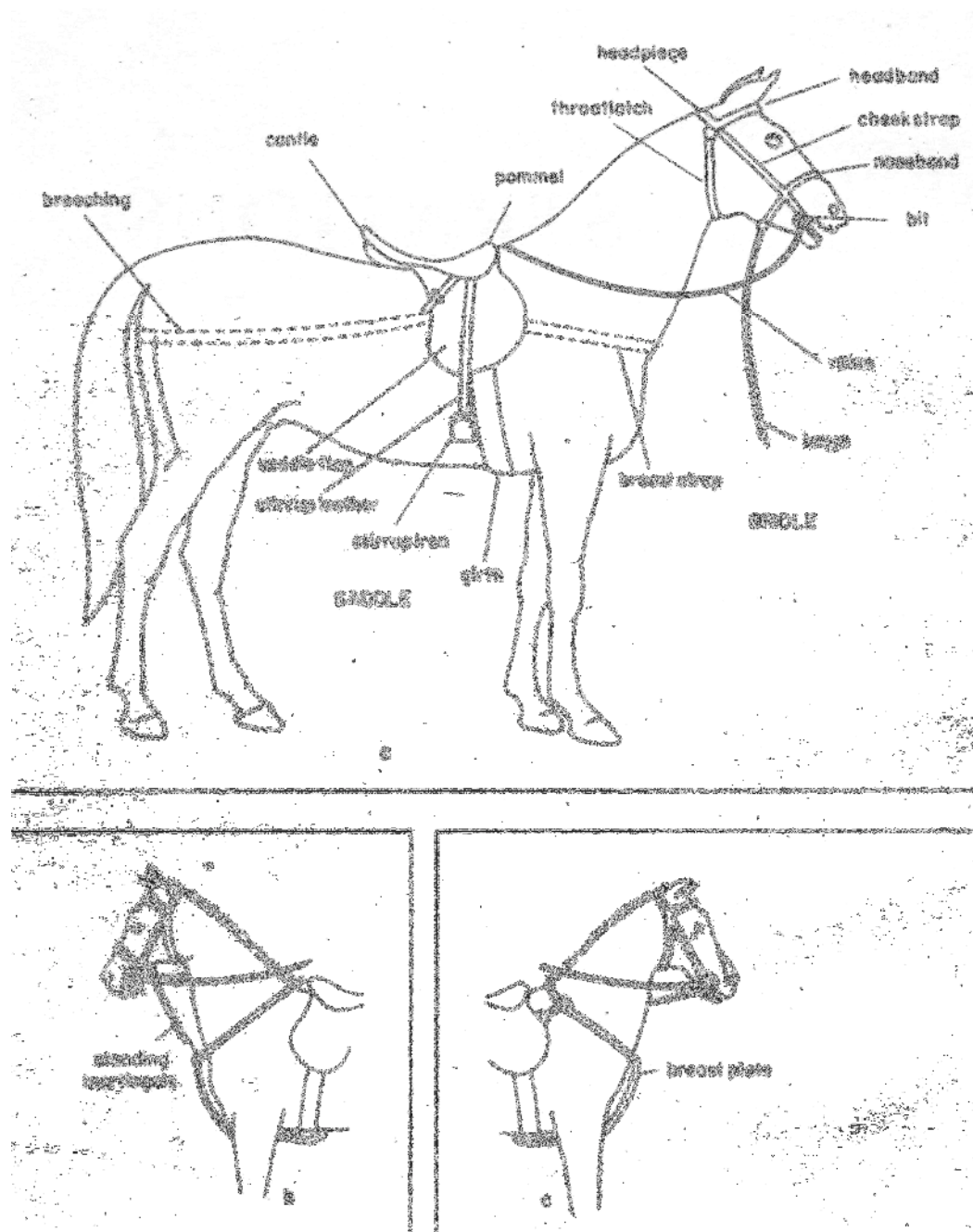
Mammals have lost their cervical and lumbar ribs which are characteristic of many reptilian groups. The first rib in many mammals, including horses, is shorter and expanded and therefore appears a bit different from the others. But it looks essentially similar in all horses, so I wouldn't think that it would have been excluded from a count of ribs (but I do not know this for sure). [Kevin Seymour, Ph.D. Assistant Curator, Palaeobiology Royal Ontario Museum [Personal communication of 21 November 2000]. **As'vam: some views from a Professor in Veterinary Anatomy** Dr. Kalyanaraman, I received your inquiry from Carolyn T Macallister, College of Veterinary Medicine, Oklahoma State University, where I am a veterinary anatomist. The R.gveda specifies that for *as'vamedha* > (horse sacrifice), the horse has 34 > ribs. Is there any hipparion or *equus* > with 34 ribs? *Equus sivalensis*? or > Caspian breed? Are there horses > with 34, 36, 38 ribs?

I am not sure which species, breed of horse, or equid the R.gveda refers to here - I suspect that these ancient words are based on the worldly experience of village people as handed down

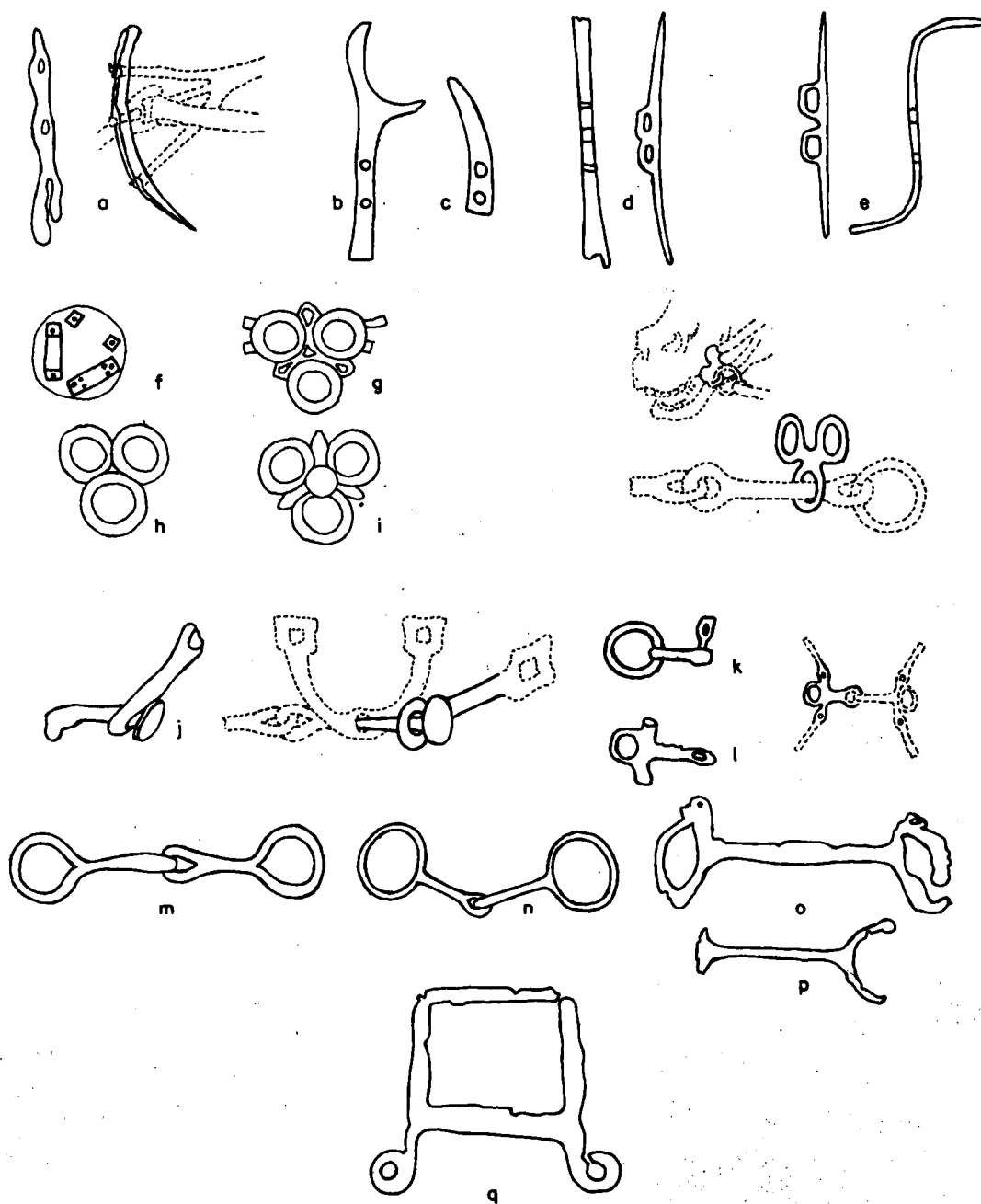
through generations ... But, today, the modern domesticated horse normally has 36 ribs (18 pair) - and any individual in a population of horses may have some variation on this number. I have been examining our dissection ponies over the years and have found a number of individuals with more or less than this "canonic" number - many of these variations were in the Shetland-type breed / crosses. So, yes, some individual domesticated horses may have more or less than the "normal" number of ribs (36). I have no information on other species of Equus, and I should warn you that there is much anecdotal false "information" in the horse-breed literature about numbers of vertebrae and ribs - I am aware of two scientific papers specifically counting ribs and vertebrae of different breeds of horse. Now, from my embryonic knowledge of the R.gveda and its basis, I suspect that the "as'vam" refers to what we know today as the domestic horse - first

domesticated on the southern steppes, probably about 5000 years ago. I also understand that it is clearly a horse in the as'vanmedha and not the smaller donkey/ass type of equid (and the horse also was the equid of veneration in temple statuary). There were and still are smaller Asiatic ass-type equids: Persia, Nepal/Tibet, to Mongolia, but the above seems to rule them out as being "as'vam." I recall the one or two donkeys we have dissected as having the same number of ribs as our horses - how many ribs the wild asses of Asia have I do not know. Hope this is of help. Since I am always interested in the "horse in history," I would appreciate knowing if you do find a substantial answer to your question. Alastair Watson, BVSc, MAgrSc, PhD Professor in Veterinary Anatomy College of Veterinary Medicine Oklahoma State University Stillwater, OK 74078].

Snaffle, bridle and other harness equipment of ancient Indian horses



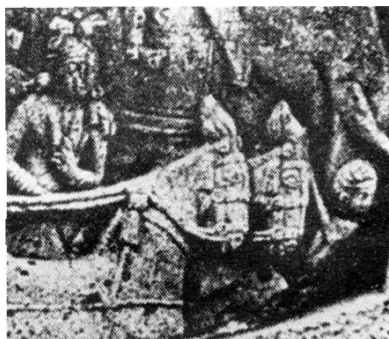
Horse trappings (After Plate 1 of Jean Deloche, 1990, *Horses and riding equipment in Indian Art*, Chennai, India Heritage Trust)



Bridle equipment recovered from excavations in India. (After Ill. 2 in: LS Leshnik, 1971, Some early Indian horse-bits and other bridle equipment, *American Journal of Archaeology*, Vol. 75, 145). a. Timurgarh (7th -6th c. BCE); b,h,m Taxila; i. Navadatoli; j. Kolhapur; k. Sambhar; l. Rairh; n. Nagpur (1st c. CE); o. Adichchanallur; p. Jadigenahalli (2nd-1st c. BCE); q. Guntakal (1st-2nd c. CE).

Bridle-bit + head band

In the following two representations, three straps are visible: two reins of the bit and the lunge of the head-band which goes round the neck. Sanchi (1st c. CE), relief, stu_pa I (After rep. in Marshall J and Foucher A, opcit, Vol. II, pl. XVII,b).



Ajanta (5th c. CE), mural painting, cave II (After rep. in Yazdani G., 1930-1958, Ajanta, Oxford, part II, pl. XXXVIII).



Mathura 1st Cent. CE, medallion, Museum of Fine Arts, Boston, (After rep. in I. Szelagowski, 1974, *Les moyens de transport dans l'Inde ancienne du I^{er} siècle avant J.C. au VII^e siècle de l'ère*

chrétienne,
Louvre,



memoire de l'Ecole du
cyclostyled, Paris, pl.

32,2).



in J.



c. CE), relief, stu_pa,
Douglas, *Sculptures from*
pl. X).

Sanchi (1st c. CE),
relief, stupa I, (After rep.
Marshall and A.
Foucher, 1940, *The Monuments of Sanchi*,
Calcutta, Vol. II, Pl. LXII). Amaravati (2nd
British Museum, London. (After rep. in Barret
Amaravati in the British Museum, London, 1954,



raw-hide. Sanchi
stu_pa I, (After
Foucher A.,
LVI).

Head collar with a nose band (without bridle-bit), made of raw-hide. Barhut
(2nd c. BCE), relief,, stu_pa, Indian Museum, Calcutta, (After rep. in Bussagli
and Sivaramamurthi C., no date, *5000 years of the Art of India*, New Delhi, 11,
fig. 6)



Head collar with a
nose band (without
bridle-bit) made of
(1st c. CE), relief,
rep. in Marshall J. and
opcit, Vol. II, pl.



Head collar with a nose band (without bridle-bit) made of
raw-hide. Sanchi (1st c. CE), relief, stu_pa I, (After rep. in
Marshall, J and Foucher A., opcit, Vol. II, pl. XXXI, and in
Zimmer H., 1954, *The Art of Indian Asia*, Vol. II, New York,
fig. 13).

Head collar with a nose band (without bridle-bit), made of raw-hide.
Jaggayyapeta (1st c. BCE), relief, stu_pa, Govt. Museum, Madras (After rep. in Zimmer, opcit,
fig.37).

Head collar with a nose band (without bridle-bit), made of raw-hide. Amaravati (1st c. CE), relief, stu_pa. (After rep. in *Archaeological Survey of India*, Annual Reports, 1908-1909, pl. XXX,b).



Head collar with a nose band (without bridle-bit), made of raw-hide. Gandhara (2nd-34d c. CE), relief, Victoria and Albert Museum, London (After rep. in Ackermann HC, *Narrative Stone Reliefs from Gandhara in the Victoria and Albert Museum in London*, Rome, 1975, pl. XV, b).



Mughal miniature, c. 1700. Bibliotheque Nationale, Paris.



Curb-bit of the Mughals. 18th c. (Dekkan, painting, Indian Office Library, London) [After rep. in Falk T. and Archer M., 1981, *Indian Miniatures in the India Office Library*, London, 522 (461)] Curb-bit of the Mughals. 17th c. Painting, Ba_burna_ma_, National Museum, New Delhi (After rep. in Randhava MS, 1983, *Paintings of Ba_burna_ma_*, National Museum, New Delhi, pl. V).

The row shows the idea of the stirrup, may be a rope with loop(s).



Sanchi (2nd c. BCE), relief, stu_pa II, (After rep. in Marshall J. and Foucher A., opcit, Vol. III, pl. XC, 84b).

Sanchi (1st c. BCE), stone Marshall J. and Foucher



image, stu_pa (After rep. in A., opcit, vol. II, pl. XXII).

Sanchi (1st c. BCE), Marshall J. and Foucher

relief, stu_pa I, (After rep. in A., opcit, Vol. II, pl. LXI).

Pitalkhora (1st c. BCE), relief, National rep. in Szelagowski I., opcit, pl. 27,3).



Bronze horse-bit of Luristan type, with cheek-pieces showing a sculpturalal ligature with an animal's body, wings, and a horned human head. 10th - 7th century BCE.



'One of the startling discoveries at Surkotada has been horse bones which have refuted the earlier belief that the use of the horse was unknown to the Harappans.' (F. Chakravarty, 1974, New Light on Harappans, *The Sunday Standard*, Madras, August 25, 1974, Magazine Section, p.1, col.2).

'But now the controversy is set entirely at rest by the excavations carried out in 1965, 1967 and 1968 under JP Joshi at Harappa_n Surkotada in Kutch. ('Exploration in Kutch and Excavation at Surkotada and New Light on Harappan Migration', *Journal of the Oriental Institute*, MSS University of Baroda, Vol. XII, Sept-Dec. 1972, Nos. 1-2, pp. 135-138, 136). For among the animals 'which were either domesticated or were in the process of domestication', the excavators discovered not only the 'ass (Equus

onager indicus)' but also the 'horse (*Equus caballus* Linn.)'. Joshi writes: 'The Harappans of Surkotada knew *Equus* right from the time of their arrival at Surkotada.' He also tells us: 'A lot of equine bones right from earlier to top levels have been recovered. A majority of them are phalanges and teeth.' Thus the possession of horses by the Gandhara Grave Culture cannot distinguish the people of it uniquely as Aryan invaders. They might easily be Indian borderlanders on the move.' (K.D. Sethna, 1992, *The Problems of Aryan Origins: From an Indian Point of View*, Second Extensively enlarged edition with five supplements, Delhi, Aditya Prakashan, p. 9).

The map drawn by Sethna on the belt of ancient Aryanism identifies a belt of ancient Aryanism which would go back in time to ca. 4000 BCE and would have a fairly developed individuality in ca. 3500-3000 BCE. Its most advanced centre would be constituted by the Rigvedic Civilization in North-west India. Its principal sites outside the region would be Kili Ghul Mohammad and Rakhigandha in North Baluchistan, Anjira in upper South Baluchistan, Mundigak in South Afghanistan, Anau in Russian Turkestan, Shah Tepe, Hissar and Sialk in Iran and Tripolye in the Ukraine. [K.D. Sethna, 1992, *The Problems of Aryan Origins: From an Indian Point of View*, Second Extensively enlarged edition with five supplements, Delhi, Aditya Prakashan, Page 75]

"The Maryanni of the Upper Euphrates, emerging into history in ca. 1460 BC, certainly appear to stem from a Rigvedic source. So also do the ruling aristocrats among the Kassites who set up by 1741 BCE a dynasty in Babylon which lasted for 576 years: they bore names with components recalling Rigvedic deities -- Suriash (sun-god, cf. Sanskrit *Surya*), Indas (cf. Sanskrit *Indra*), Maruttash (cf. Sanskrit *Marutah*, storm-gods), and are said to have had even the word *Shimalia* (Himalaya) meaning 'queen of the mountains'...they are very much later than this scripture (Rigveda) as dated by us. And in the meantime -- from the fourth millennium BCE onward into the third and second -- there was, as attested by the enormous post-Rigvedic literature, a passage out of the Indus Valley and an exploration of various parts of India eastward and southward....Archaeologists -- e.g. Pigott (1961, *Prehistoric India*, Penguin, Harmondsworth, pp. 58, 65, 75) -- have found that pottery-styles in prehistoric times link in diverse ways Turkestan's Anau with Sialk, Rakhigandha with Anau, Sialk and Rakhigandha. Pigott has also noted about Hissar and RG: "The animals depicted on the pots of the two regions -- North Persia and North Baluchistan -- differ, presumably in response to the fauna and the differing types of domesticated beast in the two cultures, but apart from this the similarities are so striking that we can claim Hissar I and RG II as parallel developments within the Red-ware area." (ibid., pp. 129-30)...We should join to them Mundigak in South Afghanistan, about whose pottery Fairervis, Jr., has the general statement: "...the Mundigak sequence is closely paralleled in northern Baluchistan -- so much so, in fact, that one can say that they are essentially of one and the same tradition." (1971, *The Roots of Ancient India*, London, Allen and Unwin, p. 134). Bridget and Raymond Allchin inform us about the early phase of Mundigak I: "Some characteristic painted designs are similar to those of Kili Ghul Mohammad II (north Baluchistan) and Anjira I (upper south Baluchistan)." (1969, *The Birth of Indian Civilization*, Penguin, Harmondsworth, p. 104)...

"One more step in the scheme of interrelated Aryanism can be taken and it is the one most pertinent to our context. Anau and Sialk no less than RG are sites where bones of the domesticated horse are said to have been found in very early times. At Shah Tepe on the shore of the Caspian Sea in Iran's extreme north-west, a little to the south-west of Anau, similar remains in more or less the same period have been claimed...

"...the total equation of the Anau equine with the onager may be controverted by a *reductio ad absurdum* with the help of the recent opinion on the equines from the ancient Indus Valley. (*Proceedings of the First All-India Congress of Zoology*, Calcutta, 1959, part 2, Scientific Papers, pp. 1-14). Lately some bones were found in Area G., Harappa, which are said to belong not to the period proper of the

Harappa_ Culture (c. 2500-1500 BC) buyt to the post-Harappa_ civilization. The earlier find by Seewll and Guha (1931) at Mohenjo-da_ro is also reported to have been from an upper level. So one does not know whether it too is part of the Indus Valley Civilization. But from the scientific account "it is evident that the Equid skeletan remains from Area G., Harappa_, belong to the true horse, *E. caballus* Linn., and not to the onager group; they resemble the modern 'country-bred' horses of India". The writer goes on to include among \the skeletan remains of the true horse' those from an upper level of Mohenjo-da_ro. But then what shall we make of Frederick Zeuner's pronouncement: "...the few boines found at Mohenjo-da_ro, which Sewell (1931) compared with the Anau horse, are likely to belong to the Indian onagers"? (1963, *A History of Domestic Animals*, London, Hutchinson, p.371) ...the case of the domesticated Anau horse (c. 4000 BC) -- Lundholm notwithstanding -- proves very sound indeed. The case for the Sialk find from Level II is even more sound. This find comprises two molars assigned by Vaufrey to the Pumpelly horse. Zeuner dismisses briefly the equines concerned: "These equines, being identified with the Anau form, have now to be regarded as half-asses also." (ibid., p. 316)...

"There is Susa in ancient Elam, where between Levels I and II, which means the beginning of the third millennium BC, an engraving on a bone depicts in a diagrammatic form a rider on an equine that, unlike an ass, has short ears and, unlike an onager, an untasselled tail and is consequently a horse, as Amschler long ago pointed out... A picture in Zeuner, the War Panel of the Standard of Ur (c. 2500 BC), sets forth onagers drawing chariots. (ibid., p. 272, Fig. 14: 6). The mane in the first register here is no more upright than that of an Egyptian chariot-drawing horse whose picture from the Tomb of CHaemhet of the 18th dynasty (c. 1500 BC) is reproduced by Zeuner. (ibid., p. 321, Fig. 12: 13)...When referring to Susa, Zeuner forgerts the bone-engraving of an equine without a rider. R. Ghirshman gives a reproduction of it with the title: 'Przewalski horse carved in bone.' (1954, *Ira_n*, A Pelican Book, Harmondsworth, 1954, p. 35, Fig. 8). The animal carved may be a tarpan for all we know or a cross, but its mane is just the sort which inclines Zeuner to "discard the Khafaje vase as an early representation of an onager."..From north of Kish in Mesopotamia comes an ideogram of the horse on a tablet. It is called "the ass of the mountains". Langdon dates it prior to 3500 BC, which is too early in Zeuner's opinion. (op.cit., p. 317). Gordon Childe ascribes it to Jamdat Nasr times (c. 3000 BC) (1934, *New Lights on the Most Ancient East*, London, Routledge, p. 161)...Piggott points to the provenance of "the ass of the mountains" when he says that it was no native of Mesopotamia and must have hailed from the hilly tracts of Persia and from Turkesta_n. (opcit, p. 158). However, Turkesta_n, Highland Persia, Balu_chista_n and the vicinity of the Caspian Sea are not the only homes of the domesticated horse. There is the Ukraine in the South-east Europe. Zeuner himself has written of the Tripolye Culture and its several phases...More recently E.D. Philips has said apropos of the chronology c. 3000-1700 BC: "...the earlier date is rather hypothetical but is supported by recent C 14 tests...The bones of horses occur at all levels, and the tame horses of this culture are probably the earliest in history." (1961, 'The Nomad Peoples of the Steppes'. *The Dawn of Civilization*, edited by Stuart Piggott, London, Thames and Hudson, 2nd impression, p. 318, col.1)...

"We cannot consider the Rigvedic part as the original centre of Aryanism. No ground exists, on available evidence to take it to be the sole seat of Aryan settlement in the age we have attributed to it, namely, 3500 to 3000 BCE -- juist as on the other hand no ground exists to give the Rigvedics an extra-Indian origin in any calculable past."

(K.D. Sethna, 1992, *The Problems of Aryan Origins: From an Indian Point of View*, Second Extensively enlarged edition with five supplements, Delhi, Aditya Prakashan, pp. 67-76).

Sarasvati Civilization

An overview

A historical project in search of River Sarasvati to discover our roots, has become a magnificent opportunity for national resurgence and to make Bharat a developed nation.

This is presented in three sections: observations, conclusions and areas for further research.

Observations

Many sparks have emerged from the anvils of scholars and researches of a variety of disciplines – all focused on the roots of civilization of Bharat.

Collated together, these sparks have become a floodlight which throws new light on the civilization of Bharat.

It is a new light on the civilization because of the following reasons:

- A mighty river, a river mightier than Brahmaputra had drained in North-west Bharat for thousands of years prior to 1500 BCE (Before Common Era).
- The collective memory of a billion people, carried through traditions built up, generation after generation, recalls a river called Sarasvati; this memory is enshrined in the celebration of a Mahakumbha Mela celebrated every 12 years at a place called Prayag where the River Ganga joins with River Yamuna. River Sarasvati is also shown as a small monsoon-fed stream in the topo-maps of Survey of India and in village revenue records in Punjab and Haryana.

Yet, the tradition holds that there is a triveni (confluence of three rivers). The third river is River Sarasvati. This tradition has now been established as a scientific fact – ground truth -- thanks to the researches carried out using satellite imageries, geo-morphological studies, glaciological and seismic studies and even the use of tritium analysis (of traces of tritium present in the bodies of water found in the middle of the Marusthali desert) by atomic scientists. The desiccation of the river was caused by plate tectonics and river migrations, between 2500 and 1500 BCE.

These studies have established beyond any doubt that River Sarasvati was a mighty river because it was a confluence of rivers emanating from Himalayan glaciers; the River Sutlej and River Yamna were anchorage, tributary rivers of River Sarasvati. The river had drained over a distance of over 1,600 kms. from Manasarovar glacier (W. Tibet) to Somnath (Gujarat) with an average width of 6-8 kms. At Shatrana (south of Patiala), satellite image shows a 20 km. wide palaeo-channel (ancient course), at the confluence of five streams – Sutlej, Yamuna, Markanda, Aruna, Somb – referred to as Pan~ca Pra_ci_ Sarasvati in Bharatiya tradition. This becomes Saptatha Dha_ra Sarasvati when two other streams – Dr.sadvati and Ghaggar – join the River Sarasvati at Sirsa

- A civilization was nurtured on the banks of this River Sarasvati as recognized through the work of archaeologists and the geographical/historical facts contained in ancient texts of Bharat, such as the *Mahabharata* and *Pura_n.a*. This civilization was an indigenous evolution from earlier than 10000 BCE and can be said to be one of the oldest civilizations in the world, heralding the Vedic heritage.

Over 2,000 archaeological sites have been discovered in the Sarasvati River Basin. There is a description, in 200 s'lokas, in the S'alya Parva of Mahabharata of a pilgrimage undertaken by Balarama, elder brother of Kr.s.n.a, along the River Sarasvati from Dwaraka to Yamunotri.

- The oldest extant human document is the R.gveda which is a compilation of 11,000 r.ca-s perceived by hundreds of seers. An understanding of this document is fundamental to an understanding of the cultural ethos of Bharat.
- R.gveda presents a world-view in allegorical and metaphorical terms perceiving an essential unity in cosmic phenomena and r.ta (a rhythm which modulates the terrestrial and celestial events alike). While the document presents the early philosophical thought related to *dharma*, it also describes the lives and activities of people – the Bharatiya. R.gveda thus presents a variegated picture covering a variety of facets of a maritime-riverine civilization, such as transport systems, agriculture, use of fire, minerals and metals to produce household utensils, ornaments, tools and weapons. Archaeologists have unearthed many examples of technology used in the days of the Sarasvati Civilization (from circa 3500 BCE to 1500 BCE). These provide evidence for the evolution of s'ankha industry in 6500 BCE, preparation of alloys such as pan~caloha, bronze, brass, pewter and bell-metal.
- A dialectical continuum has existed in Bharat from the days of R.gveda and Sarasvati Civilization. The civilization constituted a linguistic area, as it is even today in Bharat. Mleccha was a language spoken by Vidura and Yudhis.t.hira as evidenced by *Mahabharata*. Mleccha were vra_tya-s who worked with minerals and metals. The semantic structures (words and meanings) of all languages of Bharat – Munda, Dravidian or Indo-Aryan categories – present an essential unity among the speakers of various dialects of Bharat. The seven volume work on Sarasvati substantially draws upon the *Indian Lexicon*, which is a comparative dictionary of over 25 ancient languages of Bharat.
- Using this lexical repertoire of the linguistic area called Bharat, it has been possible to crack the code of the epigraphs of the civilization inscribed on over 4,000 objects including seals, tablets, weapons and copper plates. The epigraphs are composed of hieroglyphs (referred to as Mlecchita Vikalpa – picture writing --, one of the 64 arts listed by Va_tsya_yana).

The code of hieroglyphs is based on rebus (use of similar sounding words and depicted through pictures) and represent the property possessions of braziers – possessions such as furnaces, minerals, metals, tools and weapons. These were also traded over an extensive area upto Tigris-Euphrates river valley in Mesopotamia and the Caspian Sea in Europe.

- The tradition of epigraphy evidenced in punch-marked coins and copper plate inscriptions in the context of Sarasvati Epigraphs points to millions of manuscripts and documents remaining unexplored all over Bharat.

- Ongoing projects for the rebirth of River Sarasvati has opened a new vista in water management in Bharat, which has an ancient tradition of water management exemplified by the rock-cut reservoir in Dholavira, the grand anicut on Kaveri, the step wells and *pus.karin.is* in all parts of Bharat.
- Desiccation of River Sarasvati is a warning to us about the unpredictability of the impact of tectonics on hydrological systems sourced from the Himalayas, for e.g. the Rivers Ganga and Brahmaputra.

Conclusions

- River Sarasvati is neither a legend, nor a myth, but ground-truth, a river which was flowing for thousands of years prior to Vedic times.
- Bharatiya Civilization is an indigenous evolution and cultural continuity is established from the Vedic times to the present day.
- For thousands of years before the days of Mahabharata War (ca. 3000 BCE), the Bharatiya had contacts with neighbouring civilizations.
- The historicity of *Mahabharata* has been established making it a sheet anchor of Bharatiya *Itiha_sa*.
- After the desiccation of River Sarasvati (finally by about 3000 years ago), Bharatiya-s moved to other parts of the world.
- The metaphor of Samudra manthanam (celebrated in the *Bha_vata Pura_n.a*) is a depiction of the reality of a cooperating society which had united all the people of Bharat into life-activities including the environmentally sustainable use of natural resource offered by Mother Earth (Bhu_devi).
- Sarasvati is adored in Bharatiya tradition as a river, as a mother and as a divinity – *ambitame, nadi_tame, devitame sarasvati*. This is an abiding spiritual foundation which resides in the heart of every Bharatiya.
- The epigraphs evidence one of the early writing systems of the world.
- The search and discovery of River Sarasvati has revealed a thread of essential unity – a bond among the people of Bharat. This has emerged from Vedic times and continues even today. This is the unity of an integral society, a resurgent nation and a unified culture which can be found in all parts of Bharat, from the Himalayas to the Indian Ocean.
- Research Institutions have to be established in different disciplines of historical studies to study the manuscripts and documents in the archival collections in all parts of the country.
- The initiation of a project for interlinking of rivers is a laudable, first step in creating a National Water Grid which has the potential to ensure equitable distribution of water resources to all parts of the country and to make Bharat a developed nation in 15 years' time.

<p>The establishment of the Water Grid is a national imperative and should be an unmotivated action (<i>l'acte gratuite</i>) devoid of political overtones.</p>

- The establishment of an inter-disciplinary Sarasvati Research Centre in Kurukshetra will help in progressing further researches on water resources management, and study of our history, heritage and culture.

Areas for further researches

- Glaciological researches are needed in relation to the glacial source of River Sarasvati which is referred to as *Plaks.a Pras'ravan.a* in the ancient texts.
- Seismological studies are needed to determine the chronology of events connected with the submergence of Dwaraka, the Gulf of Khambat and other coastal regions of Bharat.
- Meteorological, glaciological and seismological studies have to be related to plate tectonics – the dynamic Indian plate and the evolving Himalayas – for a better understanding of the hydrological systems, sustainability and management of a National Water Grid for Bharat.
- Archaeological work on the 2,000 sites on Sarasvati River Basin have to be related to the events described in the ancient epics: *Ramayana* and *Mahabharata*
- The Vedic texts, epics and Purana-s contain historical information which can be validated through archaeological, astronomical and geographical studies.
- Epigraphical and language studies in relation to the evolution and spread of languages and scripts of Bharat.
- Scholars have to be encouraged to study the unexplored manuscripts lying in museums, libraries and private collections.
- Researches for establishing the National Water Grid should be objective and provide a new vision to reach out the water and agricultural resources of the country, equitably, to all people and for the development of the nation.

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End Notes

ⁱ Weapons mentioned in the epics are: bhus'un.d.i (MBh 3.166.15; 7.131.34; 7.154.37; 10.7.72); khad.ga (MBh 3.166.15); musala (MBh. 3.268.5; 6.114.2; 9.44.104; 10.7.27); na_ra_ca (MBh 3.268.5; r. 3.21.11, App. 384); tomara (MBh. 3.268.5; 8.7.8); asi (MBh. 3.268.5; 9.44.104); paras'vadha (MBh. 3.268.5; 6.114.2; R. 3.21.11, Ap. 384; 6.83.25); mudgara (MBh. 3.268.5; 6.114.2; R. 6.73.21); pat.t.is'a (MBh. 6.114.2); pra_sa (MBh. 6.114.2); ks.epani_ya (MBh. 6.114.2); parigha (MBh. 7.154.27; R. 6.73.21); gada_ (MBh. 5.50.24; 7.154.27; 10.7.27; R. 3.21.11, App. 384; 3.73.21); s'u_la (MBh. 7.154.27; 8.7.8; 9.44.104); hud.a (MBh. 7.154.37); gud.a (MBh. 7.154.37); sthu_n.a_ (MBh. 7.154.37); cakra (MBh. 9.44.104; 10.7.27; R. 6.83.25); pa_s'a (MBh. 10.7.27); yas.t.i (MBh. R. 6.83.25); karava_la (MBh. 3.166.14; 6.114.2; R. 6.83.24; LaliVi. 305.8-9; Das'KuC. 56.17; Matsya P. 152.2); s'akti (MBh. 4.31.9; R. 6.73.20; 6.83.24; LaliVi. 305.8-9; 306.13-15); ist.i (MBh. 6.92.56; 7.35.34); s'ara (MBh. . 6.92.56; R. 3.25, App. 465; LaliVi. 305.8-9; 306.13-15); nitrim's'a (MBh. 6.92.56); kunta (MBh. 6.92.56); paras'u (MBh. 6.92.56; 6.114.2; LaliVi. 306.13-15); s'ataghi (MBh. 6.114.2); bhin.d.ipa_la (MBh. 7.35.24; R. 6.42.19; 6.66.4; LaliVi. 306.13-15); kampan.a or karpan.a (MBh. 7.35.24; Das'KuC. 56.17); s'ila_ (R. 3.25, App. 465); bhalla (R. 6.33.43); tris'u_la (R. 6.24.5); ba_n.a (R. 6.66.4); as'ani (R. 6.69.17); hala (R. 6.83.24); dhanu (LaliVi. 305.8-9; 306.13-15); kut.ha_ra (LaliVi. 305.8-9); dan.d.a (LaliVi. 305.8-9); vajra (LaliVi. 305.8-9; 306.13-15); kan.aya or kan.apa or kun.apa (LaliVi. 305.8-9; 306.13-15; Das'KuC. 56.17; MatsyaP. 149.8; 152.2; 150.73); varman (LaliVi. 305.8-9); kavaca (MBh. 305.8-9); ca_pa (Das'KuC. 56.17); s'an:ku (MatsyaP. 149.8); an:kus'a (Matsyap. 149.8).

ⁱⁱ When did Zarathushtra live?

"At present, the majority opinion among scholars

probably inclines toward the end of the second millennium or the beginning of the first, although there are still those who hold for a date in the seventh century." (Death, War, and Sacrifice, 1991, pg 150) Humbach and Ichaporia seem to favor the Xanthos date of 1080 BC but mention the 630 date also.

"A commonly given date is the seventh century BCE. I think Boyce has convincingly shown the seventh century date to be an error. Humbach also discounts the basis of this calculation in his Gathas 1991 (pg 30). Boyce has wavered on an actual date: between 1400 and 1000 BC (1975), between 1700 and 1500 (1979), around 1400 BC (1988), between 1500 BC & 1200 BC "with the latter more likely" (1992)." (Bruce Lincoln, *Heritage*, 1994, pg 11).

ⁱⁱⁱ "Historically, the horse and the two-wheeled war-chariot come into prominence, according to Zeuner, in about 1700 BC, or slightly later, in all countries of the Near and Middle East. This is the first active phase of the Aryans' sweep from their homeland -- a movement which, in Zeuner's words, (Zeuner, Frederick, 1963, *A History of Domesticated Animals*, London, Hutchinson, p. 315) 'started about 2000 BCE or somewhat earlier'. But did the Near and Middle East -- the part of Asia which first felt the shock of the horse-driving charioteers -- know the domesticated horse for the first time in the second millennium BC?

"Piggott (opcit, p. 158) tells us: '...the horse... is not an original inhabitant of Mesopotamia, but is given the significant Sumerian name of the 'ass of the mountains' when it first appears, probably in Jamdet Nasr times. It was presumably imported from 'the mountains' of Highland Persia or Turkestan, which with Baluchistan formed a common geographical province within which the earliest evidence of horse-taming comes.' Jamdat Nasr times, by the chronological tables of both Piggott (p.65) and Zeuner (p.16) are c. 3000 BCE. So, if we may accept the above statement of Piggott's along with his other one that the horse is the really characteristic domesticated animal of the Aryans we should conclude that the homeland of the Aryans covered Highland Persia,

Turkesta_n and Balu_chista_n and that they tamed the horse there fairly before 3000 BCE...(Piggott's) vision (p. 249) of original Aryanism is: 'by about 2000 BCE... a loose confederacy of tribes, stretching from South Russia to Turkestan, who shared certain elements of culture... and who spoke closely related dialects within the Indo-European framework'. Piggott thus adds South Russia to Turkesta_n and omits both Persia and Balu_chista_n...Zeuner (p. 329) sums up (the chronological scheme of Gordon Childe): 'He believes that the wheeled cart and the potter's wheel are both inventions of the Uruk culture of southern Mesopotamia and that this happened before 3500 BCE. There is evidence that the wheeled cart was preceded by the sledge, and sledges have been found in the royal tombs of Ur which are at least 1000 years younger. The earliest evidence consists of script signs on late Uruk tablets (Childe, Fig. 1). Whilst it is generally agreed that the earliest wheeled carts were drawn by oxen, onager bones were found in the chariot graves of the Y Cemetery of Kish, which is of Early Dynastic I date. Onagers were buried with the sledger of Queen Shub-ad, whilst the king's grave contained two ox-waggon. These finds are Early Dynastic III. From this and other evidence it is to be inferred that in Mesopotamia the ox was replaced by the swifter onager, though not universally, early in the third millennium BCE. Childe held that this is the source of wheeled vehicles, that they reached the Indus Valley by about 2500 BC, north Syria -- 2200 BC, Crete -- 1900 BC, Greece -- 1550 BC, south Russia -- 1400 BC, north Italy -- 1100 BC, central and northern Europe -- 1000 BCE and Britain -- 500 BCE. This sequence looks indeed convincing, though new finds are apt to modify it...

"With its late reception of chariotry, no less than with its late domestication of the horse, South Russia must be ruled out. It cannot figure as a significant centre of early Aryan radiation...On Piggott's own declarations, there is no reason why North Persia and North Balu_chista_n should not equally with Turkesta_n be the Aryan homeland. And, with the wheeled vehicles reaching the Indus Valley by about 2500 BC, there is also no reason why from the regions thereabouts an Aryan wave

should not have passed over the Near and Middle East in the early second millennium BCE. At any rate, Piggott's evidence about the domesticated horse gives us a belt of original Aryandom from Anau to Ra_na_Ghunda_i_ as well as to Sialk in the centuries preceding 3000 BCE...

"Childe (1934, *New Light on the Most Ancient East*, London, p. 161) writes: 'It (the horse) is... mentioned in the Jamdet Nasr tablets by the same ideogram 'ass of the mountains', that was employed in classical Babylonian cuneiform'. Now, classical Babylonian cuneiform has the clear indication that the true horse is meant; so the ideogram seventeen miles north of Kish and as old as at least 3000 BC, if Langdon's estimate of 3500 is exaggerative, must be about the same animal....His (Piggott's) point is that the Mesopotamian 'ass of the mountains', whose horse-character cannot be disputed but which is no native of Mesopotamia, must have hailed from the hilly tracts of Persia and from Turkesta_n. This point about provenance can hardly be evaded and, if it has to be accepted, Shah Tepe and Sialk and Anau force themselves into the picture before 3000 BCE and the conclusion of Lundholm, discrediting the claims on their behalf, becomes exceedingly doubtful. Thus we return inevitably to the suggestion that at Anau, if the horse alone is not there, it is co-present with the onager and that at Sialk the two molars do not, on the available premises, permit their attribution to the hemione instead of the *Equus caballus* and that the pelvis and ten other equine bones at Shah Tepe are the horse's. Thus also, from Mesopotamia's acquaintance with the horse in c. 3000 BC, we are able to give some sort of precise form to Zeuner's own acknowledgment that the first domesticated horse must be considerably earlier than 2000 BC: we can safely put it high up in the fourth millennium BCE...

"H. Peake and H.J. Fleure (1956, *Times and Places*, Oxford, p. 228) have attempted to focus the significance of the equine relics of Ra_na_Ghunda_i_ I: '...four animal teeth found here have been identified as belonging to the domesticated horse. From the probable dating of later phases at RG this first settlement can hardly be dated later than the earliest part of the third millennium BCE

and is possibly older still, so that these teeth may be the earliest known trace of the domesticated horse...

'Have we any decisive signs of the Aryan invasion of India in c. 1500 BC, which is reported in all our history books? Wheeler (1959, *Early India and Pakistan*, Bombay, p. 126), referring to it as an archaeologist, says: 'it is best to admit that no proto-Aryan material has yet been identified in India'. It is not perhaps impossible that the domesticated horse may have existed without the Aryans. But the converse is never true, so far as historical knowledge goes...No Aryans, no domesticated horse. And, if that is so, the Aryan homeland was a broad territory taking in not only Turkestan, parts of Persia and all North Baluchistan but also North-western India in the fourth millennium BCE.

"Stress may be laid especially on North-western India because there we may expect the earliest development of horse-chariotry. Baluchistan is too hilly for it. The Indus-region is ideal for it. And, as we learn from Childe that next to Mesopotamia of c. 3500 BCE the oldest known area of wheeled vehicles is the Indus Valley from the beginning of the Harappa Culture in 2500 BC, we may logically conjecture a passage of the art of chariotry from Mesopotamia to the Indus-region, in hitherto unknown ways, through the period 3500-2500 BCE to make its presence felt, together with that of horses, in the hymns of the Rigveda...

"How, then, shall we explain the spoked wheels of Harappa Culture (as found on stamp seals) nearly six centuries before they appeared anywhere else in the world?...As spoked wheels are not known anywhere outside India at that period, we have to search for some clue to their background in India itself. There is no archaeological clue. The sole possible clue is literary: the R.gveda. And, if according to the horse-evidence part of the Aryan homeland lay in the Indus-region as well as North Baluchistan in the pre-Harappa age, the R.gvedic mention of horse-chariots could indicate an explanatory background, provided those chariots moved on spoked wheels. A.A. Macdonell and AB Keith

(1958, *A Vedic Index of Names and Subjects*, Delhi, Vol. II, p. 201), describing the R.gvedic chariot, state: 'the wheel consisted of a rim (pavi), a felly (pradhi), spokes (ara_) and a nave (nabhya)'. There are many references to spokes. (R.gveda 1.32.15; 141.9; 5.13.6; 58.5; 8.20.14; 77.3; 10.78.4). 'Sometimes', say Macdonell and Keith (p.201), 'a solid wheel was used'. This fact links the R.gveda to the clay-models of the Indus Valley Civilization, while the spokes account for the wheels on the stamp seals.

"The development between 3500 and 2500 BCE of the craft of chariot-making, which these seals demand but which is underivable from the land of chariot-invention, Mesopotamia, is no longer a mystery. We can legitimately see it reflected in the most ancient mass of Indo-Aryan literature...

"The most significant centre of the Aryandom was the Indus-region from about the middle of the fourth millennium BC, with perhaps an extension into the third. From there it carried on some cultural exchanges with lesser seats of Aryanism in Baluchistan, Iran and Turkestan, before it moved further east and the Indus Valley was left to the growth of the half Vedic and half non-Vedic Harappa Culture...And perhaps from the horses themselves of the R.gveda we may draw a hint of their domestication going beyond the archaeological age denoted by Rakhigarhi or Kili Gul Mohammad, the age we have allotted also to the R.gvedic Aryans of the Indus-region. Zeuner writes (pp 332-333): 'Ridgeway (1905) derived from the R.gveda descriptions of these early Aryan horses which suggest that they were chestnut-coloured on the head and back, and dun below. The chestnut colour is not primitive...'. Even if their provenance be uncertain, the non-primitive chestnut colour may afford us a glimpse of their long domestication and progressive breeding in the period before c. 3500 BC, so that the antiquity of the horse-taming Aryans of the Indus-region and of Baluchistan may be considered as great as that of their kinsmen in Turkestan and Iran." (K.D. Sethna, 2000, *Problems of Ancient India*, Delhi, Aditya Prakashan, pp. 9-43).

iv **adhiratha (chariot load)**

त्वाम् पूर्व ऋषयो गीर्भिर् आयन् त्वाम् अध्वरेषु
पुरुहूत विश्वे ।

सहस्राण्य् अधिरथान्य् अस्मे आ नो यज्ञं रौहिदश्वोप
याहि ॥

10.098.09 You have ancient sages approached, with hymns; you, O invoked of many, all worshippers (address) at sacrifice; (give) us thousands of chariot-loads, come to our sacrifice, lord of red horses.

rathes.t.ha_ (Standing on the chariot; car-fighter); sa_rathi, stha_tr. (charioteer)

ता कर्माषतरास्मै प्र च्यौत्नानि देवयन्तौ भरन्ते ।
जुजोषद् इन्द्रो दुस्मवर्चा नासत्येव सुगम्यो रथेष्ठाः ॥
तम् उं ष्टुहिन्द्रं यो ह सत्वा यः शूरो मघवा यो
रथेष्ठाः ।

प्रतीचश् चिद् योधीयान् वृषणवान् ववद्वृषश् चित्
तमसो विहन्ता ॥

1.173.04 We offer to him, (Indra), the most pious (oblations); the worshippers of the gods present to him substantial (adorations); may he, of conspicuous lustre, standing in his car, and light-moving like the As'vins, be gratified (by our worship). [Substantial adorations: cyautna_ni = causing to fall down; but, this explained as dr.d.ha_ni, firm, hard].

1.173.05 Glorify that Indra who is mighty, who is a hero, possessing abundant wealth, standing in his car, a valiant combatant against adversaries, the wilder of the thunderbolt, the dispenser of all-enveloping gloom.

इमा उं त्वा पुरुतमस्य कारोर् हव्यं वीर हव्या हवन्ते ।
धियो रथेष्ठाम् अजरं नवीयो रयिर् विभूतिर् ईयते
वचस्या ॥

1.055.01 The amplitude of Indra was vaster than the (space of) heaven; earth was not comparable to him in bulk; formidable and most mighty, he

has been ever the afflicter (of the enemies of) those men (who worship him); he has his thunderbolt for sharpness, as a bull (his horns).

युयूषतः सर्वयसा तद् इद् वपुः समानम् अर्थं
वितरित्रता मिथः ।

आद् ईम् भगो न हव्यः सम् अस्मद् आ वोळ्हुर् न
रश्मीन् सम् अयृतस्तु सारथिः ॥

1.144.03 The two (priests, the hoti_ and adhvaryu), of equal honour, and alike assiduous, labouring mutually for a common object, combine the form of Agni (with their respective functions); whereupon he to whom the oblation is to be offered, collects the drops (of clarified butter), as Bhaga (accepts the worship of all), or as a charioteer (gathers the reins of the horses) that draw (the car). [The two priests: or the two, in both this and the next hymn, may refer to the husband and wife associated in the performance of the sacrifice; as a charioteer gathers: the comparison is justified by ras'min = rays of light or reins and also, streams of butter spreading like rays].

अधाकृणोः प्रथमं वीर्यम् महद् यद् अस्याग्रे ब्रह्मणा
शुष्मम् ऐरयः ।

रथेष्ठेन हर्यश्चेन विच्युताः प्र जीरयः सिंस्रते सध्रगक्
पृथक् ॥

2.017.03 Verily, Indra, you have displayed your first great prowess, when, (propitiated) by the prayer (of the worshipper), you have put forth your withering (vigour) in his presence; and when the congregated enemies (of the gods), hurled down by you in your chariot, drawn by your horses, fled, scattered.

वृत्रखादो वलरुजः पुरं दुर्मो अपाम् अजः ।

स्थाता रथस्य हर्योर् अभिस्वर इन्द्रो दृळ्हा चिद्

आरुजः ॥

3.045.02 The devourer of Vr.tra, the fracturer of the cloud, the sender of the waters, the demolisher

of cities, Indra, the destroyer of powerful enemies, has mounted his chariot to urge his horses to our presence.

इमा उ त्वा पुरुतमस्य कारोर् हव्यं वीर हव्या हवन्ते ।
धियो रथेष्ठाम् अजरं नवीयो रयिर् विभूतिर् ईयते

वचस्या ॥

6.021.01 These earnest adorations of the much-desiring worshipper glorify you, hero, Indra, who are adorable; mounted on your car, undecaying, ever new, and to whom the wealth (of sacrifice), the most excellent opulence, proceeds.

प्र तायर् आयुः प्रतरं नवीय स्थातरिव क्रतुमता
रथस्य ।

अध च्यवान् उत् तवीत्य् अर्थम् परातरं सु निर्वृतिर्
जिहीताम् ॥

10.059.01 May the life of Subandhu be augmented so as to be more lasting and newer, as men conveyed in a car (are carried on) by a skilful (driver); he who falls from life, increases (his) desire to live; may Nirr.ti depart far off. Nirukta 6.28:...The word ratharyati means one desirous of something accomplished or one who desires a chariot. This god desires a chariot. (RV 9.3.5). This too is a Vedic quotation.

Rathya, Rathyeva cakra_: Like the chariot (of the chariot-wheel or chariot-horse); rathyeva = dual of rathi_ or two charioteers

त्रिस्रो द्यावः सवितुर् द्वा उपस्था५ एका यमस्य भुवने
विराषाट् ।

आणिं न रथ्यम् अमृताधिं तस्थुर् इह ब्रवीतु य उ तच्च
चिकेतत् ॥

1.035.06 Three are the spheres; two are in the proximity of Savita_, one leads men to the dwelling of Yama. The immortal (luminaries) depend upon Savita_ as a car upon the pin of the axle; let him who knows (the greatness of

Savita_) declare it. [amr.ta = immortals; moon and constellations are added].

त्वम् एताञ् जनराज्ञो द्विर् दशबन्धुना

सुश्रवसोपजग्मुषः ।

षष्टिं सहस्रां नवतिं नव श्रुतो नि चक्रेण रथ्या

दुष्पदावृणक् ॥

1.053.09 You, renowned Indra, overthrown by your not-to-be-overtaken chariot-wheel, the twenty kings of men, who had come against Sus'ravas unaided, and their sixty thousand and ninety-nine followers. [Perhaps, a reference to A_yus, son of Puru_rava_s].

युवं ह घर्मम् मधुमन्तम् अत्रये ऽपो न क्षोदौ ऽवृणीतम्
एषे ।

तद् वा नराव् अश्विना पश्वऽइष्टी रथ्येव चक्रा प्रति
यन्ति मध्वः ॥

1.180.04 You rendered the heat as soothing as sweet butter to Atri; wishing (for relief), and invested it with coolness, like water; therefore, for you, As'vins, leaders (of rites) the fire-offering (is made); to you the Soma (drips) run like chariot wheels (down a declivity). [The fire-offering is made: tad vam pas'va is.t.i_ pas'u = fire; agrees with the text agnir pas'ur-a_si_t, agni was the victim; the implication is that the oblations are presented through fire to the As'vins].

प्रातर्यावाणा रथ्येव वीराजेव यमा वरम् आ संचेथे ।

मेने इव तन्वा शुम्भमाने दम्पतीव क्रतुविदा जनैषु ॥

2.039.02 Moving at dawn like two heroes in a car; like a pair of goats; like two women lovely inform, or like husband and wife; come together, knowing (how sacred) ites(are to be celebrated) amongst men, (to bestow) happiness (on the worshipper).

इन्द्रैषिते प्रसवम् भिक्षमाणे अच्छा समुद्रं रथ्येव याथः ।

समाराणे ऊर्मिभिः पिन्वमाने अन्या वाम् अन्याम्

अप्य एति शुभ्रे ॥

3.033.02 Impelled by Indra, soliciting (his commands), you go to the ocean like (two)

charioteers (to their goal); flowing together, and swelling with (your) waves, bright (rivers) one of you proceeds to the other.

प्र यत् सिन्धवः प्रसवं यथायन् आपः समुद्रं रथ्येव
जग्मुः ।

अतश् चिद् इन्द्रः सदसो वरीयान् यद् ई सोमः पृणति
दुग्धो अंशुः ॥

3.036.06 As the rivers pursue their course, the waters rush to the ocean like the drivers of cars (to a goal), so the vast Indra (hastens) from his dwelling (in the firmament), when the humble Soma libation propitiates him. [The comparison: as small rivers and scanty waters contribute to the vast ocean, so the Soma, however insignificant, contributes to the gratification of the great Indra]. [Here, rathya_ = a class of drivers].

ऊर्ध्वो अग्निः सुमतिं वस्वो अश्रेत् प्रतीची जूर्णर्
देवतातिम् एति ।
भेजाते अद्री रथ्येव पन्थाम् ऋतं होता न इषितो
यजाति ॥

7.039.01 Let Agni, risen on high, accept the praise of the worshipper; she who makes (all creatures) old, looking to the west, goes to the sacrifice; the pious pair, like two riders in a chariot, follow the path (of the ceremony); let the Hota_, as enjoined, celebrate the rite. [She who makes all creatures old: prati_ci_ devata_tim eti = sarves.a_m praja_na_m jarayitri_, the cause of the decay or age of all progeny, i.e. uso.devata_, the dawn, whose successive revolutions constitute old age; the pious pair: bheja_te adri: a_driyantau s'raddha_vantau, the two reverencing or believing, i.e. the yajama_na and his wife].

प्र क्षोदसा धायसा सस्र एषा सरस्वती धरुणम् आर्यसी
पूः ।
प्रवाबधाना रथ्येव याति विश्वा अपो महिना सिन्धुर्
अन्याः ॥

7.095.01 This Sarasvati_, firm as a city made of metal, flows rapidly with all sustaining water, sweeping away in its might all other waters, as a charioteer (clears the road). [Firm as a city: dharun.am a_yasi pu_h = ayasa nirmita puri_va; dharun.am = dharun.a, dha_rayitri_, supporter]. [rathya_ = broad street].

ऋभुर् न रथ्यं नवं दधाता केतम् आदिशे ।

शुक्राः पवध्वम् अर्णसा ॥

9.021.06 As a great man sets before him a commendable charioteer, so do you grant knowledge to our lord, and flow glistening with water.

यमस्य मा यम्यं काम आगन् समाने योनौ
सहशेय्याय ।

जायेव पत्यै तन्वं रिरिच्यां वि चिद् बृहेव रथ्येव
चक्रा ॥

न तिष्ठन्ति न नि मिषन्त्य एते देवानां स्पश इह ये
चरन्ति ।

अन्येन मद् आहनो याहि त्वं तेन वि बृह रथ्येव
चक्रा ॥

10.010.07 (Yami speaks). The desire of Yama has approached me Yami_, to lie with him in the same bed; I will abandon my person as a wife to her husband; let us exert ourselves in union like the two wheels of a wagon.
10.010.08 (Yama speaks). The spies of the gods, which wander upon earth, never stop, never close their eyes. Associate quickly, destructress, with some other than with me, and exert yourselves in union, like the two wheels of a wagon. [Destructress: i.e., causing unhappiness by your shameful conversation].

स सूर्यः पयर् उरू वरस्य एन्द्रो ववृत्याद् रथ्येव
चक्रा ।

अतिष्ठन्तम् अपस्यं न सर्गं कृष्णा तमांसि त्विष्या

जघान ॥

10.089.02 The heroic Indra causes numerous rays of light revolve as a charioteer (effects the rotation of) the wheels of the chariot; he destroys by his radiance the black darkness like a restless active horse.

पृणीयाद् इन् नाधमानाय तव्यान् द्राघीयलतसम् अनु
पश्येत् पन्थाम् ।

ओ हि वर्तन्ते रथ्येव चुक्रान्यम्भान्यम् उप तिष्ठन्तु
रायः ॥

10.117.05 Let the very rich man satisfy his suitor, let him look forward to a more protracted route, for riches revolve from one man to another, as the wheels of a chariot turn round. [A more protracted route: i.e., the road of virtue; let him look further along the path of life, and he will see riches deserting the rich and going to others. Fortune is fickle].

Ya_na, syandana (Chariot, Vehicle)

सिन्धुर् ह वां रसया सिञ्चद् अश्वान् घृणा वयो

ऽरुषासः परि ग्मन् ।

तद् ऊ षु वाम् अजिरं चैति यान् येन पती भवथः

सूर्यायाः ॥

4.043.06 The flowing (stream) has sprinkled your steeds with moisture; the radiant horses (like) birds (in swiftness) pass on, bright with lustre; well known as that quick-moving chariot, whereby you became the lords of Su_rya. [The flowing stream: sindhu, this may mean here, either water or a cloud].

अभि व्ययस्व खदिरस्य सारम् ओजो धेहि स्पन्दने

शिंशपायाम् ।

अक्षं वीळो वीळित वीळयस्व मा यामाद् अस्माद् अव

जीहिपो नः ॥

3.053.19 Fix firmly the substance of the khayar (axle), give solidity to the s'is'u (floor) of the car; strong axle, strongly fixed by us, be strong; cast us not from out of our conveyance. [khayar and s'is'u: khadirasya sa_ram is the text; khadira = mimosa catechu of which the bolt of the axle is made; while the s'im.s'apa, dalbergia sisu furnishes wood for the floor; these are still timber-trees in common use].

cakra (wheel; disc -- weapon)

सूरश् चक्रम् प्र बृहज् जात ओजसा प्रपित्वे वाचम्

अरुणो मुषायती ऽशान् आ मुषायति ।

ऽशान् यत् परावतो ऽजगन् उत्तये कवे ।

सुम्नानि विश्वा मनुषेव तुर्वणिर् अहा विश्वेव तुर्वणिः ॥

1.130.09 Endowed with augmented vigour, he hurled (against the foes) the wheel (of the chariot) of the sun; and, ruddy of hue, deprived them of existence; he, the sovereign lord, deprived them of existence. As you, sage Indra, come from afar to the succour of Us'ana_, so do you come quickly, bearing all good things (to us) every day. [su_ras'cakram prav.r.had = he threw the sun's wheel; su_ryasya rathasya cakram, the wheel of the chariot of the sun: the legend is that the asuras obtained a boon from Brahma_, that they should not be destroyed by the thunderbolt of Indra, and having in consequence defied him, he cast at them the wheel of the sun's car, which was equally fatal. Another legend: the sun (of Indra) having risen, urges on his car, and Arun.a (his charioteer) silences the clamour (of his enemies); the lord (of day) dissipates the gloom. Deprives them of existence: va_cam mus.a_yati = lit. steals or takes away speech; speech is a metonymy for breath, i.e. life; or, it may mean, silence clamour or suppress his own exclamation].

चतुर्भिः साकं नवतिं च नामभिश्च चक्रं न वृत्तं व्यतीर्ष
अवीविपत् ।

बृहच्छरीरो विमिमान् ऋक्वभिर् युवाकुमारः प्रत्य् एत्य्
आह्वम् ॥

1.155.06 He causes, by his gyrations, ninety and four periodical revolutions, like a circular wheel, vast of body, and evolving in many forms, through the praises (addressed to him); ever young, though not infantine, he comes at our invocations. [Ninety and four periodical revolutions: vis.n.u = time, comprising ninety-four periods; the year, two solstices, five seasons, twelve months, twenty-four half months, thirty days, eight watches, and twelve zodiacal signs; though not infantine: yuva_ akuma_rah, young a boy; akuma_rah = analpah, not little].

सखे सखायम् अभ्य आ ववृत्स्वाशुं न चक्रं रथ्यैव

रंहास्मभ्यं दस्म रंहा ।

अग्ने मृळीकं वरुणे सचा विदो मरुत्सु विश्वभानुषु ।

तोकाय तुजे शुशुचान शं कृध्य अस्मभ्यं दस्म शं

कृधि ॥

4.001.03 Friendly and beautiful (Agni), bring your friend (Varrun.a) to our presence, as two strong horses convey the swift chariot along the road to its goal; you receive, Agni, the gratifying (oblation) together with Varun.a, and with the all-illuminig Maruts; grant, brilliant Agni, happiness to our sons and grandsons; grant, beautiful Agni, happiness to ourselves.

Nirukta 4.27...**sapta_diyaras'maya iti vadanti.**
sapta **yunjanti** **ratham;**
ekacakramekaca_rin.am; cakram cakaterva;
caraterva; kra_materva; ekos'vo vahati
saptana_ma_dityah; sapta_smai ras'mayo
rasa_nabhisanna_mayanti; saptainamr.s.ayah
stuvanti_tī va_...There are seven rays of the sun, they say. Seven yoke the one-wheeled car. One horse having seven names draws it. Three-navelled is the wheel, imperishable and irresistible, on which all these worlds rest (RV 1.164.2). Seven yoke the one-wheeled car, i.e. the car which moves on a single wheel. Cakram (wheel) is derived from (the root) cak (to repel), or car (to move), or kram (to go). One horse having seven names draws it, i.e. the sun: seven rays draw up the juices for him, or the seven seers praise him...The seer praises the year, on which all created beings rest together, with all measures. When the five-spoked wheel began to roll. This is

with reference to the five seasons. There is the Bra_hman.a passage: There are five seasons in the year, taking the winter and the dewy season together. (AB 1.1; S'B 1.3.5.1; 1.7.2.8). Six are said to have been inserted. This is with reference to the six seasons, which are inserted in the navel as spokes...The twelve-spoked one does never decay. One wheel and twelve fellies. (1.164.48). These are with reference to months. A month is (so called) from measuring. Felly, it is well secured. In it are placed together three hundred spokes, as it were, and sixty moving one after another. There is the Bra_hman.a passage: Verily, there are three hundred and sixty days and nights in a year. (GB 1.5.5; AB 2.17; S'B 1.3.5.9; 12.3.2.3). This is taking the day and the night together (i.e. as one). There stood seven hundred and twenty. (RV 1.164.11). There is the Bra_hman.a passage: Verily, there are seven hundred and twenty days and nights in a year. This is taking the day and the night separately (i.e. as two).

Nabhya (axle or central part of the solid disc wheel, i.e. the part held at the axle-end), pradhi (felly)

S'Br 3.5.3.20: nabhyasthe karoti, tad dhi ks.emasya ru_pam, 'he makes them rest on the middle board (the plank in which the nave is fitted standing in upright position, for that is the appearance of rest'. Alt. 'he makes them rest on their naves'. KS 25.8:114.2 (havirdha_nas'akat.a) nabhya_bhya_m ubhayato baddha, upadhibhya_m sam.das.t.o.

द्वादश प्रधयश् चक्रम् एकं त्रीणि नभ्यानि क उ तच् चिकेत ।

तस्मिन् साकं त्रिशता न शङ्कवो ऽर्पिताः षष्टि न

चलाचलासः ॥

1.164.48 The fellies are twelve; the wheel is one; three are the axles; but who knows it? within it are collected 360 (spokes), which are, as it were, moveable and immoveable. [The wheel is the year of twelve months; the three axles are the three double seasons, or hot, wet and cold; and the three hundred and sixty spokes are the days of the

lunar-solar year; stanah s'as'ayah, s'aya_na, sleeping; dehe vartama_nah, abiding in the body].

na_bhi (nave of a chariot-wheel)

अच्छा मही बृहती शूलततमा गीर् दूतो न गन्तव्
अश्विना हुवधै ।

मयोभुवा स्रथा यातम् अवाग् गन्तं निधिं धुरम्

आणिर् न नाभिम् ॥

5.043.08 May this adoring, earnest, and gratifying praise go like a messenger to summon the As'vins hither; come, As'vins, givers of happiness, riding in one chariot, come down to the deposited (Soma), as the bolt (is essential) to the axle of the wagon. [As the cart cannot move if the axle of the wheel is not fastened by the pin or bolt, so the offering of the Soma is without efficacy unless the As'vins be present].

अयं रौचयद् अरुचौ रुचानो ऽयं वासयद् व्य ऋतेन
पूवीः ।

अयम् ईयत ऋतयुग्भिर् अश्वैः स्वर्विदा नाभिना

चर्षणिप्राः ॥

6.039.04 This radiant (Indra) has illumined the non-radiant (worlds); he has pervaded many dawns with true lustre the benefactor of men moves in (a chariot) drawn by horses, harnessed by praise, laden with riches.

यस्मिन् विश्वानि काव्या चक्रे नाभिर् इव श्रिता ।

त्रितं जूती संपर्यत व्रजे गावो न संयुजै युजे

अश्वाअयुक्षत् नभन्ताम् अन्यके संमे ॥

8.041.06 In whom all pious acts are concentrated, like the nave in the (centre of the) wheel, worship him quickly who abides in the three worlds; as men assemble the cattle in their pasture, so do (our foes) collect their horses (to assail us); may all our adversaries perish.

रथानां न ये ऽराः सनाभयो जिगीवृलतसो न शूरा

अभिद्यवः ।

वरेयवो न मर्या घृतप्रुषो ऽभिस्वर्तारो अर्कं न सुष्टुभः ॥

10.078.04 Who (are) united to a common centre like the spokes (of the wheels) of chariots, brilliant like victorious heroes, sprinkling water like benevolent men, sweet-voiced like men who recite praise.

kha (hole in the nave of a chariot wheel; or, the part of wheel which held the holes both for spokes and axle)

सम् इत् तान् वृत्रहाखिदत् खे अराइव खेदया ।

प्रवृद्धो दस्युहाभवत् ॥

8.077.03 The slayer of Vr.tra dragged them along as spokes (are tied fast) with a rope in the nave of a chariot wheel; he swelled in vigour, the slayer of enemies. [With a rope: cf. RV 8.72.8].

खे रथस्य खे ऽनसः खे युगस्य शतक्रतो ।

अपालाम् इन्द्र त्रिष् पूत्व्य अकृणोः सूर्यत्वचम् ॥

8.091.07 Thrice, S'atakratu, did you purify Apa_la_, in the hole of the chariot, in the hole of the cart, and in the hole of the yoke, and you did make here with a skin splendid like the sun. [Thrice did you purify: Indra dragged her through the wide hole of his chariot, the narrower hole of the cart, and the small hole of the yoke, and she cast off three skins. The first skin became a hedge-hog, the second an alligator, the third a chameleon].

आग्नें स्थूरं रयिम् भरं पृथुं गोमन्तम् अश्विनम् ।

अङ्घ्रि खं वर्तया पणिम् ॥

10.156.03 Bring us, Agni, substantial and extensive wealth, consisting of cattle and horses, sprinkle the sky (with rain), expel Pan.i.

Was **pradhi** a part of the solid disc wheel, a felly or the frame (ku_barin, skambha) of the 'ratha'?

उत प्रधिम् उद् अहन्न अस्य विद्वान् उपायुनग्
वृलतसंगम् अत्र शिक्षन् ।

इन्द्र उद् आवत् पतिम् अघ्न्यानाम् अरहत पद्याभिः
ककुद्धान् ॥

10.102.07 The sage (Mudgala) has fitted up the frame of the cart, he has harnessed the bull, training him to his work; Indra protected the lord of the inviolable (cows), the buffalo rushed along with speed.

pavi (ks.ura_) (razor tire); pavi = armed wheels of a battle car; name of a weapon
भूरीणि भद्रा नर्येषु बाहुषु वक्षस्सु रुक्मा रभसासौ
अञ्जयः ।

अलतसेष्व एताः पविषु क्षुरा अधि वयो न पक्षान् व्य
अनु श्रियौ धिरे ॥

1.166.10 Maruts, in your arms, propitious to man, are many good things; on your breasts are golden (ornaments) brilliant and conspicuous; while garlands (hang) on your shoulders; sharp are (the edges of) your weapons; the Maruts have various decorations, as birds have (many-coloured) wings.

त्रयः पवयो मधुवाहने रथे सोमस्य वेनाम् अनु विश्व
इद् विदुः ।

त्रयं स्कम्भासं स्कभितासं आरभे त्रिं न याथस् त्रिं व
अश्विना दिवा ॥

1.034.02 Three are the solid (wheels) of your abundance-bearing chariot, as all (the gods) have known (it to be), when attendant on Vena, the beloved of Soma; three are the columns placed (above it) for support, and in it thrice do you journey by night, and thrice by day. [As'vins went to the marriage of Vena with Soma and loaded their ratha (chariot) with goodies; skambhasah skabhita_sa a_rabhe = posts standing up from the body of the car, which the riders held, to avoid being thrown off by the rapid or uneven motion of the car].

ते ऽरुणेभिर् वरम् आ पिशङ्गैः शुभे कं यान्ति रथतूर्भिर्
अश्वैः ।

रुक्मो न चित्रः स्वधित्वान् पव्या रथस्य जङ्घनन्त
भूम ॥

1.088.02 To what glorifier (of the gods) do they repair with their ruddy, tawny, car-bearing horses for his advantage? bright as burnished (gold), and armed with the thunderbolt, they furrow the earth with their chariot-wheels.

युवो रजांसि सुयमासो अश्वा रथो यद् वाम् पयर्
अर्णांसि दीयत् ।

हिरण्यया वाम् पवयः प्रुषायन् मध्वः पिबन्ता उषसः
सचेथे ॥

1.180.01 As'vins, your horses are traversers of the (three) regions, when your chariot proceeds to (its desired) quarters; the golden fellies of your wheels grant (whatever is wished for); drinking the Soma, you participate in the morning (rite).

वृष्णे यत् ते वृषणो अर्कम् अर्चान् इन्द्र ग्रावाणो
अदितिः सजोषाः ।

अनश्वासो ये पवयो ऽरथा इन्द्रैषिता अभ्यु अवर्तन्त
दस्यून् ॥

5.031.05 When the Maruts, the showerers (of benefits), glorify you, Indra, the showerer (of desires), with praises, and the exulting stones delight (to bruise the Soma), then, without horses, without chariots, they, the purifying (Maruts), dispatched by Indra, have overcome the Dasyus.

उत स्म ते परुष्ण्याम् ऊर्णा वसत शुन्ध्यवः ।

उत पव्या रथानाम् अद्रिम् भिन्दुन्त्य ओजसा ॥

5.052.09 Whether they (abide) on the Parus.n.i (river), or, purifying (all), they clothe themselves with light, or whether they break through the clouds with strength by the wheels of their chariots. [urn.a_ vasata s'undhyavah = diptih

s'odhikah a_ccha_dayanti = purifiers they put on light].

Nirukta 5.5: ...pavi rathanebhirbhavati; yadvipuna_ti bhu_mim; uta pavya_ratha_namadrim bhindantyojasa; tam marutah ks.urapavina_vyayuh; ityapi nigamau bhavatah...Pavi means the rim of a wheel, (so called) because it brushes away the earth. Lo! with the rim of their chariots they rend the mountain with their might. The Maruts destroyed him with the edge of their sword. The two are Vedic quotations....

vartani_ (felloe, rut, track, course); vartis (RV 1.116.18; 1.30.10; 5.73.3; 8.22.4: the chariot course of the As'vins) [Note: the term, **vartana** is used by Kikkuli in his horse training manual written in Hittite].

त्वं करञ्जम् उत पर्णयं वधीस् तेजिष्ठयातिथिग्वस्य
वर्तनी ।

त्वं शता वङ्गदस्याभिन्तु पुरो ऽनानुदः परिषूता
ऋजिश्चना ॥

1.053.08 You have slain Karan~ja and Parn.aya with your bright gleaming spear, in the cause of Atithigva; unaided, you did demolish the hundred cities of Van:grida, when besieged by R.jis.van. [Van:gr.da is an asura; R.jis.van is a ra_ja_].

स्वश्वा यशसा यातम् अर्वाङ् दस्त्रा निधिम् मधुमन्तम्
पिबाथः ।

वि वां रथो वध्वा यादमानो ऽन्तान् दिवो बाधते
वर्तनिभ्याम् ॥

7.069.03 Well-horsed and celebrated, come, As'vins, to our presence; drink, Dasras, the sweet pledge; your chariot, conveying you, with your spouse, furrows with its two wheels the extremities of the sky.

इयम् उ ते अनुष्टुतिश् चकृषे तानि पौलतस्या ।
प्रावश् चक्रस्य वर्तनिम् ॥

8.063.08 This praise is yours, for you have achieved those exploits; you have guarded the road of our chariot-wheel (to the sacrificial rite).

Upadhi, Nabhya and Pradhi: pieces of composite disc wheel of 'ratha'

शङ्खैव नः प्रथमा गन्तम् अर्वाक् छफाव् इव जभुराणा
तरोभिः ।

चक्रवाकेव प्रति वस्तोर् उस्त्रार्वाच्चा यातं रथ्येव शक्रा ॥

नावेव नः पारयतं युगेव नभ्येव न उपधीव प्रधीव ।

श्चानेव नो अरिषण्या तनूनां खगलेव विस्त्रसः पातम्
अस्मान् ॥

2.039.03 [Of As'vini_kuma_ra] Come to us, the first (before other gods), like a pair of horns, or like two hoofs, travelling with rapid (steps); like a pair of cakrava_kas, awaiting day; overthrower of foes, like warriors in cars, able (to perform all things), come to our presence.

2.039.04 Bear us across (the sea of life), like two vessels, or (over difficult places), like the poles of a car, the axles, the spokes, the fellies (of two wheels). Be like two dogs, warding off injury to our persons, and, like two coats of mail, defend us from decay.

Upa_nasa [Second car]

सचायोर् इन्द्रश् चक्रईष आउपानसः सपर्यन् ।

नदयोर् विव्रतयोः शूर इन्द्रः ॥

10.105.04 Indra, the friend of man, for his exhilaration, comes mounted in his chariot, granting him favour, the hero Indra, (the driver) of the two neighing and prancing (steeds).

[S'Br 1.1.2.4-22: anas is havirdha_Na cart; parts: dhu_r (pole), ni_d.a, kasthambhi_ (two cross khadira sticks used as a prop for the yoke of a standing cart), prauga, i_s.a_ (pole to which the draught animal is yoked)].

Nirukta 11.47: ...Being afraid, Us.as has fled from the shattered car, i.e .the cloud. Anas means wind, derived from (the verb) an (to breathe). Or else it may be for the sake of comparison, i.e. as if from

the car. Anas means a car, (so called) because rags are tied to (a_-nah) it, or it may be derived from (the verb) an, meaning to live: it is a means of livelihood for people. [Note: This shows that some sort of hackney carriages, or carriages which plied for hire, were obtainable in the time of Ya_ska.] Cloud is called anas from the same very also. Because the strong bull, the rainer, i.e. the atmospheric god, has struck it down. The following, another stanza, is addressed to her...Here lies her car, shattered and all broken into pieces. She has fled afar. Here lies her car, shattered in such a manner as if it were a different car altogether. Broken into pieces, i.e. without a single connected piece. Dawn has fled far, being pushed out, or being pursued.

pa_talya (Pins that were liable to slip out, patanas'i_le ki_lake)

स्थिरौ गावौ भवतां वीळू अक्षो मेषा वि वह्निं मा युगं
वि शारि ।

इन्द्रः पातल्ये ददतां शरीतोर् अरिष्टनेमे अभि नः
सचस्व ॥

3.053.17 May the horse be steady, the axle be strong, the pole be not defective, the yoke not be rotten; may Indra preserve the two yoke-pins from decay; car with uninjured felloes, be ready for us. [The horses: ga_vau gaccheta iti ga_vau as'vau: ga_va_ implies those who go, or, in this place, horses; car be ready for us: Vis'va_mitra being about to depart from the sacrifice of Suda_s, invokes good fortune for his conveyance].

prauga (Forepart of the pole of the Soma cart; praugas'astra is recited by the hotr. at the morning Soma yajn~a)

कासीत् प्रमा प्रतिमा किं निदानम् आज्यं किम् आसीत्
परिधिः क आसीत् ।

छन्दः किम् आसीत् प्रडुगं किम् उक्थं यद् देवा देवम्
अयजन्त विश्वे ॥

10.130.03 What was the authority (of the sacrifice), what was the limitation, what was the first cause, what was the clarified butter, what was the enclosure, what was the metre, what was prauga text, when the universal gods offered worship to the gods? [When the Sa_dhyas, assembled as agents of creation, offered sacrifice to Praja_pati, the question was: how should this Yajn~a be prepared?]

aritra (?oar; ?some chariot part-- side, perhaps)

अरित्रं वां दिवस् पृथु तीर्थे सिन्धूनां रथः ।

धिया युयुज्ज इन्दवः ॥

1.046.08 Your vessel, vaster than the sky, stops on the seashore; your chariot (waits on the land); the drops (of Soma) are expressed for your worship.

प्राता रथो नवो योजि सस्त्रिश् चतुर्युगस् त्रिकशः

सप्तरश्मिः ।

दशारित्रो मनुष्यः स्वर्षाः स इष्टिभिर् मुतिभी रंह्यो भूत् ॥

2.018.01 A laudable and pure sacrifice, has been instituted at dawn; having four pairs (of stones for bruising the Soma); three tones (of prayer); seven metres, and ten vessels; beneficial to man, conferring heaven, and sanctifiable with solemn rites and praises. [A laudable and pure sacrifice: pra_ta ratho navo yoji ratho ranhan.a_d yajn~ah: the word ratha, as derived from ranh., to ho = worship, sacrifice; as a chariot, it has been harnessed, ayoji; provided with four yokes, catur yuga; three whips, trikas.a; seven reins, saptaras'mi; and ten sides or faces, das'a aritra; such a figurative chariot is a conveyance to svarga, applicable to yajn~a., sacrifice].

i_s.a_ [pole (of a chariot; sometimes, two poles: AV 2.8.4)]

यं कुमारं नवं रथम् अचक्रम् मनसाकृणोः ।

एकैषं विश्वतः प्राञ्चम् अपश्यन् अधि तिष्ठसि ॥

10.135.03 The new chariot, wheelless, single-poled, but turning everywhere, which you, my child, mentally formed-- you stand thereon though you see it not. [My child: or, Kuma_ra, a proper name]. Cf. 3.053.17

rajju (rope, for horse-trappings); **s'i_rs.n.ya_ras'ana_** = head halter

अक्षानहौ नद्यतनोत सौम्या इष्कृणुध्वं रशना ओत
पिशत ।

अष्टावन्धुरं वहताभितो रं येन देवासो अनयन् अभि
प्रियम् ॥

10.053.07 (The gods to one another). Drinkers of the Soma, bind (the horses) that are to be fastened to the pole; prepare the reins; caparison (the steeds); accompany everywhere (in your cars) the chariot which has eight seats with which the gods bring us acceptable (wealth).

यद् वाजिनो दामं सदानम् अर्वतो या शीर्षण्या रशना
रज्जुर अस्य ।

यद् वा घास्य प्रभृतम् आस्ये तृणं सर्वा ता ते अपि
देवेष्व अस्तु ॥

1.162.08 May the halter and the heel-ropes of the fleet courser, and the head-ropes, the girths, and any other (part of the harness); and the grass that has been put into his mouth; may all these be with you, (horse), amongst the gods. [The heel-ropes: **da_ma** = a rope fastened round the horse's neck; **sanda_na** = one that fastens his feet; any other part of the harness: **s'is.an.ya_ras'ana_rajjuh**: **s'irs.an.ya_** = the rope that is fastened to the head, the reins; **rajjuh** = rope].

निक्रमणं निषदनं विवर्तनं यच्च पड्वीशम् अर्वतः ।
यच्च पपौ यच्च घासिं जघास सर्वा ता ते अपि
देवेष्व अस्तु ॥

pad.bi_sa (foot-fetters of the horse)

1.162.14 May the place of going forth, of tarrying, of rolling on the ground; the foot-fastening of the horse, (the water) that he has drunk, the grass that he has eaten; may all these be thine among the gods.

kaks.a (girdle, girth-band) [Note that the horse is also bound by his mouth; indications of the use of bridle or bit of a bridle -- **kavika_** or **pragraha?**]

उत स्य वाजी क्षिपणिं तुरण्यति ग्रीवायाम् बद्धो
अपिकृक्ष आसनि ।

क्रतुं दधिक्रा अनु संतवीत्वत् पथाम् अङ्कांस्य् अन्व
आपनीफणत् ॥

4.040.04 And that horse bound by his neck, his flanks, his mouth, accelerates his paces; **Dadhikra_** increasing in vigour after the (sacred rite), following the windings of the roads, goes still more rapidly.

ras'mi (rope, reins); **da_ma** (rope around the horse's neck); **abhi_s'u** (reins); **sam.da_na** (halter to hold the horses); **sr.j** = to loosen the reins (**ras'mi_**: RV 8.32.23).

यूयं धूर्षु प्रयुजो न रश्मिभिर् ज्योतिष्मन्तो न भासा
व्युष्टिषु ।

श्येनासो न स्वयंशसो रिशादंसः प्रवासो न प्रसितासः
परिग्रुषः ॥

10.077.05 You (move along) like horses harnessed to the chariot-poles with reins; at break of day you (are endowed) with radiance like the luminaries (of heaven); you are like hawks, like the destroyers of foes, desirous of renown; you cover the ground like travellers, you move everywhere.

सहस्तौमाः सहच्छन्दस आवृतः सहप्रमा ऋषयः सप्त
दैव्याः ।

पूर्वेषाम् पन्थाम् अनुदृश्य धीरा अन्वालेभिरे रथ्यो न
रश्मीन्

10.130.07 Associated with praises, accompanied by metres invested, having authority, the seven divine r.s.is, bold, and observing the path of their predecessors like charioteers, took up the reins. [Seven divine r.s.is: the r.s.is are Mari_ci and the rest; or, the seven officiating priests; their predecessors are An:girasa and the elder r.s.is; or, the gods employed in the creation].

यद् वाजिनो दाम् संदानम् अर्वतो या शीर्षण्या रशना
रज्जुर अस्य ।

यद् वा घास्य प्रभृतम् आस्ये तृणं सर्वा ता ते अपि
देवेष्व अस्तु ॥

1.162.08 May the halter and the heel-ropes of the fleet courser, and the head-ropes, the girths, and any other (part of the harness); and the grass that has been put into his mouth; may all these be with you, (horse), amongst the gods. [The heel-ropes: da_ma = a rope fastened round the horse's neck; sanda_na = one that fastens his feet; any other part of the harness: s'is.an.ya_ras'ana_rajjuh: s'irs.an.ya_ = the rope that is fastened to the head, the reins; rajjuh = rope].

वृषणस् ते अभीशवो वृषा कशा हिरण्ययी ।

वृषा रथौ मघवन् वृषणा हरी वृषा त्वं शतक्रतो ॥

8.033.11 Showerers (of benefits) are your reins, such also is your golden whip, your chariot, Maghavan, is a showerer (of benefits), so are your two horses; and you, too, S'atakratu, are the showerer (of benefits).

सुरथाआतिथिगवे स्वभीशूआर्क्षे ।

आश्वमेधे सुपेशसः ॥

8.068.16 (I receive) two steeds with excellent chariots from the son of Atithigva, two with excellent reins from the son of R.ks.a, two with excellent ornaments from the son of As'vamedha.

kas'a_ (whip)

रथीव कश्याश्वाअभिक्षिपन् आविर् दूतान् कृणुते
वृष्याअह ।

दूरात् सिंहस्य स्तनथा उद् ईरते यत् पर्जन्यः कृणुते
वृष्यं नभः ॥

5.083.03 As a charioteer, urging his horses with his whip, brings into view the messenger (of war), so Parjanya, (driving the clouds before him), makes manifest the messengers of the rain; the roaring of the lion-(like cloud) proclaims from afar that Parjanya overspreads the sky with rainy clouds. [The messenger of war: the text has only du_ta_n = bhat.a_n, warriors].

ketu (banner, flag or, part of flag)

तत् त इन्द्रियम् परमम् पराचैर् आधारयन्त कवयः
पुरेदम् ।

क्षमेदम् अन्यद् दिव्य् अन्यद् अस्य सम् ई पृच्यते
समनेव केतुः ॥

1.103.01 The sages have formerly been possessed of this your supreme power, Indra, as if it were present with them, one light of whom shines upon the earth, the other in heaven, and both are in combination with each other, as banner (mingles with banner) in battle.

अवेयम् अश्वेद् युवतिः पुरस्ताद् ये गवाम् अरुणानाम्
अनीकम् ।

वि नूनम् उच्छाद् असति प्र केतुर् गृहंभगृहम् उप
तिष्ठते अग्निः ॥

1.124.11 This youthful Us.a_, approached from the east; she harnesses her team of purple oxen. Assuredly she will disperse the darkness, a manifest sign (of day) in the firmament; the (sacred) fire is kindled in every dwelling.

gadha_ (Roof of 'ratha')

यासि कुत्सेन स्रथम् अवस्युस् तोदो वातस्य हयोर
ईशानः ।

ऋत्रा वाजं न गध्यं युयूषन् कविर् यद् अहन् पार्याय
भूषात् ॥

तम् इद् व इन्द्रं सुहवं हुवेम् यस् ता चकार नया
पुरूणि ।

यो मावते जरित्रे गध्यं चिन् मक्ष् वाजम् भरति
स्पाह्राधाः ॥

4.016.11 You go with Kutsa in the same chariot, determined to defend him; (you) who are the tormentor (of foes), the lord of horses (of the speech) of the wind; on the same day wherein, yoking (to the car) the straight-going steeds, as if to receive food, the sage (Kutsa) has been enabled to cross over (the sea) of calamity.

4.016.16 Let us invoke that gracious Indra who has made so many things good for man; who, bestowing enviable opulence, quickly brings acceptable food to a worshipper like me.

इमं युजं चनौ धा अग्न उशन् यं तं आसानो जुहुते
हविष्मान् ।

भरद्वाजेषु दधिषे सुवृम् अवीर् वाजस्य गध्यस्य
सातौ ॥

6.010.06 Agni desirous (of the offering), accept this sacrifice, this food which the presenter (of the oblation), sitting down (before you), offers unto you; accept the blameless (praises) of the bha_radva_ja (race), and favour them that they may obtain many sorts of food.

त्वां वाजी हवते वाजिनेयो महो वाजस्य गध्यस्य
सातौ ।

त्वां वृत्रेष्व् इन्द्र सत्पतिं तरुत्रं त्वां चष्टे मुष्टिहा गोषु
युध्यन् ॥

6.026.02 The son of Va_jini, (Bharadva_ja), offering (sacrificial) viands, invokes you for (the

sake of) acquiring obtainable and abundant food; (he invokes) you, Indra, the preserver of the good, the defender (from the wicked), when enemies (assail him); he depends upon you when, lifting up his fist, he is fighting for (his) cattle.

kos'a (chariot-box or chariot-body);
rathani_d.a = little shelf where the charioteer stood; go = in the sense of cow-hide wrapping the chariot-body

वनस्पते वीड्वङ्गो हि भूया अस्मत्सखा प्रतरणः
सुवीरः ।

गोभिः सृलतनद्धो असि वीळ्यस्वास्थाता तै जयतु
जेत्वानि ॥

6.047.26 (Chariot made of the) forest lord, be strong of fabric; be our friend; be our protector, and be manned by warriors; you are wrapped with cow-hides; keep us steady; and may he who rides in you be victorious over conquered (foes). [Be manned by warriors: suvi_ro bhava = s'u_rabhat.t.aih putra_dibhir va_ yuktah, joined with warriors, or with sons and the rest; you are wrapped with cow-hides: gobhih sannaddhosi = you are bound together by cow; govika_raih, by what are formed from cattle; in the next r.ca, gobhira_vr.tam = carmabhih parita aves.t.itam, encompassed round with hides, as if the exterior of the war-chariot especially were so strengthened; or, encompassed with rays of light, or with splendours, gobhih, tejobhih].

उपह्वरेषु यद् अचिध्वं ययिं वयं इव मरुतः केन चित्
पथा ।

श्रोतन्ति कोशा उप वो रथेष्व् आ घृतम् उक्षता
मधुवर्णम् अर्चते ॥

1.087.02 When, Maruts, flying like birds along a certain path (of the sky), you collect the moving passing (clouds) in the nearest portions (of the firmament), then, coming into collision with your cars, they pour forth (the waters); therefore, do you shower upon your worshipper the honey-

coloured rain. [madhuvarn.am = having the colour of honey, i.e. being equally pure (svaccha)].

चित्तिर् आ उपबर्हणं चक्षुर् आ अभ्यङ्गनम् ।

द्यौर भूमिः कोश आसीद् यद् अयात् सूर्या पतिम् ॥

10.085.07 Citti (mind) was the pillow, the eye was the collyrium; heaven and earth were the box when Su_rya went to her husband.

पूष्णश् चक्रं न रिच्यति न कोशो ऽव पद्यते ।

नो अस्य व्यथते पविः ॥

6.054.03 The discus of Pu_s.an does not destroy; its sheath is not discarded, its edge harms not us.

garta (seat of the archer); talpa (MBh. 7.38.5)

अभ्रातेव पुंस एति प्रतीची गतारुग् इव सनये

धनानाम् ।

जायेव पत्य उशती सुवासा उषा हस्त्रेव नि रिणीते

अप्सः ॥

1.124.07 She goes to the west, as (a woman who has) no brother (repairs) to her male (relatives); and like one ascending the hall (of justice) for the recovery of property, (she mounts in the sky to claim her lustre); and like a wife desirous to please her husband, Us.a_ puts on becoming attire, and smiling as it were, displays her charms. [abhra_teva pum.sa eti prati_ci_ = as a damsel who has no brother, averted from her own abiding place (garta iti gr.hana_ma, kr.daro gartah (Nirukta 3.4.3), goes to or relies upon her male relatives, pum.sah, for support; or it may mean that she is in such case to offer the funeral cakes to her progenitors; prati_ci_, with face averted, as applicable to Us.a_, means looking or going to the west; garta_rug iva sanaye dhana_na_m, like one who ascends (a_ruh, to mount) a house (garta-gr.ha) for the gift or receipt of riches; garta = stool or table on which dice are thrown; there is a practice in the south, in which a childless widow seeks to obtain support from her husband's relatives by repairing to a gambling-house; cf. Muller, Preface, 2nd vol. of the R.gveda, p. xvi].

स्तुहि श्रुतं गर्तसदं युवानम् मृगं न भीमम् उपहृत्तम्
उग्रम् ।

मृळा जरित्रे रुद्र स्तवानो ऽन्यं ते अस्मन् नि वपन्तु
सेनाः ॥

2.033.11 Glorify the renowned Rudra, riding in his car, ever youthful, destructive, fierce like a formidable wild beast; Rudra, propitiated by praise, grant happiness to him who praises (you), and let your hosts destroy him who is our adversary.

हिरण्यरूपम् उषसो व्युष्टाव् अयस्थूणम् उदित्ता

सूर्यस्य ।

आ रौहथो वरुण मित्र गर्तम् अतश् चक्षाथे अदितिं

दितिं च ॥

5.062.08 At the break of dawn, at the rising of the sun, ascend Mitra and Varun.a, your golden-bodied, metal-pillared car, and thence, behold the earth and its inhabitants. [Yajus. 10.15; atas'caks.a_the aditim ditim ca = aditim akahn.d.ani_yam praja_dikam, the divisible people; alternative reading: aditim = adinam, not base, i.e. vihita_nus.ta.ta_ram, one who follows what is prescribed, i.e., performs his religious duties; ditim = dinam, base or na_stikavr.ttam, an infidel].

वृष्टिद्यावा रीत्यापेषस् पती दानुमत्याः ।

बृहन्तं गर्तम् आशाते ॥

5.068.05 Senders of rain from heaven, granters of desires, lords of sustenance, suited to the liberal donors (of oblations), they ascend their spacious car.

स ई स्पृधो वनते अप्रतीतो बिभ्रद् वज्रं वृत्रहणं गभ

स्तौ ।

तिष्ठद् धरी अध्य् अस्तैव गर्ते वचोयुजा वहत इन्द्रम्

ऋष्वम् ॥

6.020.09 Bearing in his hand the foe-destroying thunderbolt, Indra, unresisted, demolishing those

his adversaries; he mounts his two-horse (car), as a warrior (ascends) his chariot; harnessed at a word, his steeds, convey the mighty Indra.

Nirukta 3.5:...Garta signifies the pillar of the assembly-room...There she who has neither son nor husband ascends. There they strike her with dies. She obtains wealth. The cemetery heap is called garta also, being derived from the root gur (to raise); it is raised up...Chariot is called garta also, being derived from (the root) gr._ meaning to praise: it is the most praised vehicle. Ascent the chariot, O Mitra and Varun.a (RV 5.62.8)

di_rgha_psas (having a long forepart?)

चत्वारो मा मशशरिस्य शिश्वस् त्रयो राज्ञ आयवसस्य
जिष्णोः ।

रथौ वाम मित्रावरुणा दीर्घाप्साः स्यूमगभस्तिः सूरौ
नाद्यौत् ॥

1.122.15 The four (silly) sons of Mas'ar's'a_ra, the three of the victorious monarch A_yavasa (annoy) me. Let your spacious and bright-rayed chariot, Mitra and Varun.a, blaze (before them) like the sun (filling them with fear). [s'is'vah = s'is'avah, infant, i.e. infantile, childish].

yuga (yoke); yojana (yoking, team); yukta (yoked-animal: RV 4.32.17); yu (to harness, yoke: RV 8.26.20; 6.60.2)

सूर्यो देवीम् उषसं रोचमानाम् मर्यो न योषाम् अभ्यु
एति पश्चात् ।

यत्रा नरो देव्यन्तौ युगानि वितन्वते प्रति भद्राय भ
_द्रम् ॥

1.115.02 The sun follows the divine and brilliant Us.a_, as a man (follows a young and elegant) woman; at which season, pious men perform (the ceremonies established for) ages, worshipping the auspicious (sun), for the sake of good (reward). [Ages: yuga_ni, also meaning 'yokes for ploughs'; at this season (dawn), men seeking to propitiate the gods by the profit which agriculture yields,

equip their ploughs, or engage in the labours of the field].

नावेव नः पारयतं युगेव नभ्येव न उपधीव प्रधीव ।

श्वानेव नो अरिषण्या तनूनां खगलेव विस्त्रसः पातम्

अस्मान् ॥

2.039.04 Bear us across (the sea of life), like two vessels, or (over difficult places), like the poles of a car, the axles, the spokes, the felines (of two wheels). Be like two dogs, warding off injury to our persons, and, like two coats of mail, defend us from decay.

ता भुज्युं विभिर् अद्भ्यः समुद्रात् तुग्रस्य सुनुम् ऊहथु
रजोभिः ।

अरेणुभिर् योजनेभिर् भुजन्ता पतत्रिभिर् अर्णसो निर्
उपस्थात् ॥

6.062.06 They bore up from the waters, from the ocean, by the winged horses attached to their car, (passing) by roads unsoiled by dust, Bhujyu, the son of Tugra; they (bore them) from out of the lap of the water. [arn.aso nirupastha_t, from the womb of the water, jalasya yoneh samudra_d abhyo nir agamayatam].

उतो न्व अस्य यन् महद् अश्ववद् योजनम् बृहद् ।

दामा रथस्य ददृशे ॥

8.072.06 As soon as the great stout harness of his horses is seen (in the sky), the traces of his chariot.

यथा युगं वस्त्रया नहन्ति धरुणाय कम् ।

एवा दाधार ते मनो जीवातवे न मृत्यवे ऽथो

अरिष्टतातये ॥

10.060.08 As men bind the yoke with cords for its support, so has (Agni) placed your spirit (in the body) for life, not for death, but for security. [Yuga was a straight beam, tied to the pole].

dhur (harnessing a horse to the car, pole, fore-carriage); a draught animal could also be harnessed between two dhurau [baddha -

bound: RV 4.40.4: gri_va_ya_m baddho
apikaks.a a_sani-- said of Dadhikra_van)

को अद्य ये धुरि गा ऋतस्य शिमीवतो भामिनो

दुर्हणायून् ।

आसन्निषून् ह्रस्वसो मयोभून् य एषाम् भृत्याम्

ऋणधत् स जीवात् ॥

1.084.16 Who yokes today to the pole of the car (of Indra) his vigorous and radiant steeds, whose fury is unbearable, in whose mouths are arrows, who trample on the hearts (of enemies), who give happiness (to friends). (The sacrificer) who praises their (performance of their) duties obtains (long) life.

रोहिच् छयावा सुमदंशूर ललामीर् द्युक्षा राय

ऋज्राश्वस्य ।

वृषण्वन्तम् बिभ्रती धूर्षु रथम् मन्द्रा चिकेत नाहुषीषु

विश्व ॥

1.100.16 The red and black coursers, long-limbed, well-caparisoned, and celestial, an dharnessed, well-pleased, to the yoke of the chariot in which the showerer of benefits is conveyed, for the enrichment of R.jra_s'va, an dis recognized amongst human hosts. [nahus.i_s.u viks.u: nahus.a = man, human o rmanly; vis. = man; viks.u = sena_laks.an.a_su praja_su, people designated as an army].

वायुर् ये रोहिता वायुर् अरुणा वायू रथे अजिरा धुरि

वोळ्हेवे वहिष्ठा धुरि वोळ्हेवे ।

प्र बोधया पुरधिं जार आ संसतीम् इव ।

प्र चक्षय रोदसी वासयोषसः श्रवसे वासयोषसः ॥

1.134.03 Va_yu yokes to his car his two red horses; Va_yu (yokes) his purple steeds; Va_yu (yokes) his two unwearied (coursers) to his car to bear their burden; for most able are they to bear the burden. Arouse Va_yu the intelligent (sacrificer), as a gallant (awakens) his sleeping mistress; summon heaven and earth; light up the

dawn; light up the dawn (to receive) your sacrificial food. [rohita = red; arun.a = purple].

उभे धुरौ वहिर् आपिबद्मानो ऽन्तर् योनेव चरति

द्विजानिः ।

वनस्पतिं वन आस्थापयध्वं नि षू दधिध्वम् अखनन्त

उत्सम् ॥

10.101.11 The beast of burden pressed with the two cart-poles, moves as if on the womb of sacrifice having two wives. Place the chariot in the wood, without digging store up the Soma.

vandhura (Seat of a chariot, or, wicker basket on wagon?)

क्व त्री चक्रा त्रिवृतो रथस्य क्व त्रयो वन्धुरो ये

सर्नीळाः ।

कदा योगौ वाजिनो रासभस्य येन यज्ञं नासत्योपयाथः

॥

1.034.09 Where, Na_satyas, ae the three wheels of your triangular car? where the three fastenings and props (of the awning?) When will be the harnessing of the powerful ass, that you may come to the sacrifice? [triv.to rathasya = tribhira'sribhir-upetasya rathasya; the front of the car is the apex and the back of the car is the base forming three angles; ra_sabha = gardabha, ass; ra_sabha_vas'vinoh, two asses are the steeds of As'vins].

रोदसी आ वदता गणश्रियो नृषाचः शूराः

शक्वाहिमन्यवः ।

आ वन्धुरेष्व् अमतिर् न दर्शता विद्युन् न तस्थौ मरुतो

रथेषु वः ॥

1.064.09 Maruts, who are distinguished in troops, who are benevolent to men, who are heroes, and whose strength is deadly in your anger, you make heaven and earth resound (at your coming); your (glory) sits in the seat-furnished chariots, conspicuous as (a beautiful) form, or as the lovely lightning.

अचेति दस्त्रा व्य उ नाकम् ऋण्वथो युञ्जते वां स्थयुजो
दिविष्टिष्व अध्वस्मानो
दिविष्टिषु ।

अधि वां स्थाम वन्धुरे रथे दस्त्रा हिरण्यये ।

पथेव यन्ताव् अनुशासता रजो ऽञ्जसा शासता रजः ॥

1.139.04 Dasras, your purpose is known; you would repair to heaven; your charioteers harness (your steeds) for your heavenward journey; the horses that injure not (the car) on your journey to heaven. We have placed you, Dasras, in your golden three-shafted chariot, going by an (easy) road to heaven, humiliators (of enemies), and principal regulators of the rain. [an~jasa_s'a_sata_rajas = udakam, water; vr.s.ti-laks.an.am, metony for rain].

द्रवतां त उषसा वाजयन्ती अग्ने वातस्य पथ्याभिर्
अच्छ ।

यत् सीम् अञ्जन्ति पूर्य हविर्भिर् आ वन्धुरैव तस्थतुर्
दुरोणे ॥

3.014.03 May the good-bestowing day and night hasten to you while you, Agni meet them on the paths of the wind; since (the priests) ever worship you preceding (them) with oblations, whilst they (united) like the pole (and the yoke of a wagon), abide successively in our dwelling. [Preceding: pu_rvyam = sa_yam pra_tah ka_layoh pu_rvyam, i.e., Agni is worshipped at dawn before the day, and in the evening before night].

रं हिरण्यवन्धुरं हिरण्याभीशुम् अश्विना ।

आ हि स्थाथो दिविस्पृशम् ॥

8.005.28 Ascend, As'vins, your sky-touching chariot with a golden seat and golden reins.

अहं तष्टैव वन्धुरम् पयर् अचामि हृदा मतिम् ।

कुवित् सोमस्यापाम् इति ॥

10.119.05 I revolve the song of praise in my heart as a carpenter (making) a charioteer's seat, for I have often drunk of the Soma.

rabhi (support-shaft)

हिरण्ययी वां रभिर् ईषा अक्षौ हिरण्ययः ।

उभा चक्रा हिरण्यया ॥

8.005.29 Golden is its supporting shaft, golden the axle, golden both the wheels.

aks.a, aks.u (axle, sometimes projecting from the nave of the wheel)

आ घ त्वावान् त्मनास्तोतृभ्यो धृष्णव् इयानः ।

ऋणोर् अक्षं न चुक्रयोः ॥

1.030.14 O Dhr.s.nu, let some such divinity as you are, self-presented, promptly bestow, when solicited, (bounties) upon your praisers, as (they whirl) the axle of the wheels (of a car). [dhr.s.n.u = resolute, firm, high-spirited (Indra); aks.am na cakrayoh = of the two wheels of a car; praks.ipanti (= turn over) is assumed].

विश्वानि भद्रा मरुतो रथेषु वो मिथस्पृध्यैव तविषाण्य
आहिता ।

अलतसेष्व् आ वः प्रपथेषु खादयो ऽक्षौ वश् चक्रा

समया वि वावृते ॥

1.166.09 Maruts, all good things are in your cars; on your shoulders abides emulous strength; at your resting-places on the road refreshments (are ready); the axle of your (chariot) wheels holds them firmly together. [At your resting places: prapathes.u kha_dayah, an indication of facilities for shelter and provisions to travellers].

आ वां दानाय ववृतीय दस्त्रा गोर् ओहैण तौग्रयो न
जिब्रिः ।

अपः क्षोणी संचते माहिना वां जूर्णो वाम् अक्षुर

अलतहसो यजत्रा ॥

1.180.05 Dasras, may I bring you, by the vehicle of my prayers, (hither), to bestow (upon me your aid), like the infirm son of Tugra; heaven and earth combine (to worship you) through your greatness; may this, your aged (worshipper), adorable (As'vins), enjoy long life, (exempt) from sin.

स्थिरौ गावौ भवतां वीळू अक्षो मेषा वि वहि मा युगं
वि शारि ।

इन्द्रः पातल्ये ददतां शरीतोर् अरिष्टनेमे अभि नः

सचस्व ॥

3.053.17 May the horse be steady, the axle be strong, the pole be not defective, the yoke not be rotten; may Indra preserve the two yoke-pins from decay; car with uninjured felloes, be ready for us. [The horses: ga_vau gaccheta iti ga_vau as'vau: ga_va_ implies those who go, or, in this place, horses; car be ready for us: Vis'va_mitra being about to depart from the sacrifice of Suda_s, invokes good fortune for his conveyance].

अक्षो न चक्रयोः शूर बृहन् प्र ते मद्वा रिरिचे

रोदस्योः ।

वृक्षस्य नु ते पुरुहूत वया व्य ऊतयो रुरुहृ इन्द्र

पूवीः ॥

6.024.03 Mighty hero, by your magnitude, (the exten) of heaven and earth is exceeded, as the axle by the (circumference of the) wheels; invoked of many, your numerous benefits, Indra, spread out like the branches of a tree.

ara (spoke, or parts of bi-partite, or tri-partite solid disc wheels); arati; nemi

इन्द्रो यातो ऽवसितस्य राजा शमस्य च शुङ्गिणो

वज्रबाहुः ।

सेद् उ राजा क्षयति चर्षणीनाम् अरान् न नेमिः परि ता
बभूव ॥

1.032.15 Then Indra, the wilder of the thunderbolt, became the sovereign of all that is moveable or immoveable, of hornless and horned

cattle; and as he abides the monarch of men, he comprehended all things (within him), as the circumference comprehends the spokes of a wheel.

त्वया ह्य अग्ने वरुणो धृतव्रतो मित्रः शशद्रे अर्यमा
सुदानवः ।

यत् सीम् अनु क्रतुना विश्वथा विभूर् अरान् न नेमिः
परिभूर् अजायथाः ॥

1.141.09 By you, Agni; Varun.a, observant of his duties and Mitra and Aryaman, bountiful divinities, are animated, so that yo have been born comprehending them all universally in all (their) functions, and encompassing (them all) as the circumference (encompasses) the spokes (of a wheel).

दधन्वे वा यद् ईम् अनु वोचद् ब्रह्माणि वेर् उ तत् ।

परि विश्वानि काव्या नेमिश् चक्रम् इवाभवत् ॥

2.005.03 Whatever (offerings the priest) presents, whatever prayers he recites, he, (Agni), knows them all; he comprehends all priestly acts, as the circumference (includes the spokes) of a wheel.

अग्ने नेमिर् अराइव देवृलतस् त्वम् परिभूर् असि ।

आ राधश् चित्रम् ऋञ्जसे ॥

5.013.06 Agni, you encompass the gods as the circumference (surrounds) the spokes (of a wheel); bestow manifold wealth upon us.

अरा इवेद् अचरमा अहेव प्रभप्र जायन्ते अकवा

महोभिः ।

पृश्ने पुत्रा उपमासो रभिष्ठाः स्वया मत्या मरुतः सम्
मिमिक्षुः ॥

5.058.05 Like the spokes of a wheel, none (of you) are inferior (to the rest), but equal as days (of like duration); the sons of Pr.s.n.i are born all alike, none inferior in splendour; rapid in speed, the Maruts, of their own free favour send down (the rains).

तरणिर् इत् सिंघासति वाजम् पुरंध्या युजा ।

आ व इन्द्रम् पुरुहूतं नमे गिरा नेमिं तष्टेव

सुद्वृद्धश्शेषवम् ॥

7.032.20 The prompt offers (of praise), with solemn rites combined, acquires food; I bend down with adoration to you, Indra, the invoker of many, as a carpenter bends the wooden circumference of the wheel. [Felloe was bent into shape, nam-].

तं नेमिम् ऋभवौ यथा नमस्व संहतिभिः ।

नेदीयो युजम् अङ्गिरः ॥

8.075.05 O An:girasa, with the deities associated in the invocation draw this offering near you as the R.bhus (bend) the circumference of a wheel. [cf. RV 7.32.20].

स्थानां न ये ऽराः सनाभयो जिगीवृलतसो न शूरा

अभिद्यवः ।

वरेयवो न मर्या घृतपुषो ऽभिस्वर्तारो अर्कं न सुष्टुभः ॥

10.078.04 Who (are) united to a common centre like the spokes (of the wheels) of chariots, brilliant like victorious heroes, sprinkling water like benevolent men, sweet-voiced like men who recite praise.

अग्निं होतारम् ईळते वसुधितिम् प्रियं चेतिष्ठम् अरतिं

न्य् एरिरे हव्यवाहं न्य्

एरिरे ।

विश्वायुं विश्ववेदसं होतारं यजतं क्विम् ।

देवासो रण्वम् अवसे वसूयवो गीभी रण्वं वसूयवः ॥

1.128.08 They, (the devout), praise Agni, the invoker (of the gods), the possessor of wealth, the beloved, the thoughtful; they have recourse to him as to a sovereign; they have recourse to him as the bearer of oblations; to him, who is the life (of all living beings), who knows all things, the offerer of oblations, the object of worship, the sage; the sacred (priests), desirous of affluence, murmur (his praises) to obtain his protection; desirous of

affluence, they murmur (his praises) in their hymns.

तं देवा बुधे रजसः सुदुलतसंसं दिवस्पृथिव्योर् अरतिं

न्य् एरिरे ।

स्थम् इव वेद्यं शुक्रशौचिषम् अग्निम् मित्रं न क्षितिषु

प्रशुलतस्यम् ॥

2.002.03 The gods have stationed at the root of the world, that Agni who is of goodly appearance; the pervader of heaven and earth; who is to be known as a car (to convey men to their wishes); who shines with pure radiance, and who is to be honoured as a friend among mankind. [At the root of the world: budhne rajasah lokasya mu_le, i.e. the altar].

त्वां ह्य अग्ने सदम् इत् समन्यवो देवासो देवम् अरतिं

न्येरिरे इति कृत्वा न्येरिरे ।

अमर्त्यं यजत मर्त्येष्व् आ देवम् आदेवं जनत प्रचेतसं

विश्वम् आदेवं जनत प्रचेतसम् ॥

4.001.01 Since the emulous gods ever excite you, Agni, who are a deity swift of motion, (to contest), therefore do (your worshippers) urge you by their devotions (to bring the deities to their sacrifices); adorable Agni, they (the deities), have generated you, immortal, divine, all-wise, as the present divinity among men; they have generated you as the all-present and all-wise deity. [The emulous gods: samanyavo deva_sas tvam nyerire: samanyavah = spardhama_nah, viewing with. In this and the next verse, there is a repetition at the end of the line of three or four preceding words; thus, adevam janata pracetasam, vis'vam adevam janata pracetasam, with a slight modification of meaning in the repetition].

यः स्मारुन्धानो गध्या समत्सु सनुतरश् चरति गोषु

गच्छन् ।

आवित्रह्जीको विदथा निचिक्यत् तिरो अरतिम्

पअद्भृश्व आप आयोः ॥

4.038.04 Who, opposing the mingled multitude in battles, rushes eager, passing through the regions, whose vigour is manifest, who, understanding

what is to be known, puts to shame the adversary of the (pious) man. [vidhata_nicikyat tiro aratim parya_pa a_yoh = jn~a_tavya_ni janam aramana_m arim va_ tiraskaroti stoturmanus.yasya, knowing things cognizable, who disgraces the opponent, or the foe of the man, the praiser].

aris.t.anemi (uninjured fellow or circumference of a wheel; a rim may also surround a solid disc wheel)

स्वस्ति न इन्द्रो वृद्धश्रवाः स्वस्ति नः पूषा विश्ववेदाः ।

स्वस्ति नस् ताक्ष्यो अरिष्टनेमिः स्वस्ति नो बृहस्पतिर् दधातु ॥

1.089.06 May Indra, who listens to much praise, guard our welfare; may Pu_s.an, who knows all things, guard our welfare; may Ta_rks.ya, with unblemished weapons, guard our welfare. [Ta_rks.ya, son of Tr.ks.a is Garud.a. He is Aris.t.anemi, he who has unharmed or irresistible (ar.s.t.a) weapons (nemi, circumference of a wheel). Aris.t.anemi is a Praja_pati (Va_yu Pura_n.a). Ta_rks.ya = Arun.a, the personified dawn].

स्थिरौ गावौ भवतां वीळू अक्षो मेषा वि वर्हि मा युगं वि शारि ।

इन्द्रः पातल्ये ददतां शरीतोर् अरिष्टनेमे अभि नः

सचस्व ॥

3.053.17 May the horse be steady, the axle be strong, the pole be not defective, the yoke not be rotten; may Indra preserve the two yoke-pins from decay; car with uninjured felloes, be ready for us. [The horses: ga_vau gaccheta iti ga_vau as'vau: ga_va_ implies those who go, or, in this place, horses; car be ready for us: Vis'va_mitra being about to depart from the sacrifice of Suda_s, invokes good fortune for his conveyance]. Nirukta 9.2: The horse as draught animal desires a comfortable chariot and the encouraging shout of the inciter; the male organ (desires) the two hairy rims; the frog (desires) the pond; flow, Indu, flow

for Indra's sake. The horse as a draught animal; the draught animal (desires) a comfortable (chariot) [the draught animal is a chariot]. The word sukham (comfortable) is a synonym of 'good'...

aks.a_nah (axle-holders)

अक्षानहौ नद्यतनोत सौम्या इष्कृणुध्वं रशना ओत पिशत ।

अष्टवन्धुरं वहताभितो रं येन देवासो अनयन् अभि प्रियम् ॥

10.053.07 (The gods to one another). Drinkers of the Soma, bind (the horses) that are to be fastened to the pole; prepare the reins; caparison (the steeds); accompany everywhere (in your cars) the chariot which has eight seats with which the gods bring us acceptable (wealth).

a_n.i (axle-bolt or axle-pin)

अच्छा मही बृहती शूलततमा गीर् दूतो न गन्त्व अश्विना हुवध्यै ।

मयोभुवा स्रथा यातम् अर्वाग् गन्तं निधिं धुरम्

आणिर् न नाभिम् ॥

5.043.08 May this adoring, earnest, and gratifying praise go like a messenger to summon the As'vins hither; come, As'vins, givers of happiness, riding in one chariot, come down to the deposited (Soma), as the bolt (is essential) to the axle of the wagon. [As the cart cannot move if the axle of the wheel is not fastened by the pin or bolt, so the offering of the Soma is without efficacy unless the As'vins be present].

aks.a_n.a (aks.a + a_n.i ?)

मक्षू ता त इन्द्र दानाप्रस आक्षणे शूर वज्रिवः ।

यद् घ शुष्णस्य दुम्भयो जातं विश्वं सयावभिः ॥

10.022.11 Hero, Indra, (your worshippers glorify) those prompt exploits performed by you in battle, (by you who are) ever bountiful, when with your

associate (Maruts) you destroyed the whole race of S'us.n.a.

**anas (maha_nasa = maha_ratha KS'S 14.2.31);
Indra mounted on an anas:**

सचायोर् इन्द्रश् चक्रईष आउपानसः सपर्यन् ।

नदयोर् विव्रतयोः शूर इन्द्रः ॥

10.105.04 Indra, the friend of man, for his exhilaration, comes mounted in his chariot, granting him favour, the hero Indra, (the driver) of the two neighing and prancing (steeds).

S'akat.i (cart; havirdha_nas'akat.a: A_pS'S 1.17.5; 10.6.3; TS 6.2.9.1; the cart carries rice or barley and is made of khadira or other wood; parts: aks.a, i_s.a_, yuga, cakra, yuga-ki_laka or yuga-s'amyā_, the yoke-pins, aks.a-s'amyā_, the axle-pins (Raghuvī_Ra, 1934, 'Implements and Vessels used in the Vedic sacrifice,' JRAS, 283-305).

उत गाव इवादन्त्यु उत वेश्मेव दृश्यते ।

उतो अरण्यानिः सायं शकृटीर् इव सर्जति ॥

10.146.03 It is as if cows are grazing, and it looks like a dwelling, and Aranya_ni at eventide, indeed, dismissed the carts.

s'amyā_, yoke-pin, wedge or two yoke-pins, one on either side of the neck of an ox, for keeping the oxen in place

स्तरीर् यत् सूत सद्यो अज्यमाना व्यथिर् अव्यथीः

कृणुत स्वगोपा ।

पुत्रो यत् पूर्वः पित्रोर् जनिष्ट शम्यां गौर् जगार यद् ध

पृच्छान् ॥

10.031.10 When a barren cow being suddenly impregnated bears (a calf), she the repeller of evils, free from pain, self-protected, produces (offspring); when (Agni), the ancient son, is generated by his two parents, earth ejects the S'ami_ which the priests are seeking. [S'ami_: s'ami_garbha_dagnim manthanti: Taittiri_ya

Bra_hman.a 1.1.9; the cow which was barren is the S'ami_ tree, which brings forth the as'vattha, and from the wood of these two trees are made the aran.i, the two pieces of wood which are rubbed together to produce the sacred fire-- the upper and harder piece is the s'ami_ (acacia suma) and the lower and softer piece is the as'vattha (ficus religiosa); the ancient son: or, the saviour from hell, from put and tra].

**Rathava_hana = anas (Sa_yan.a) (Conveyor
or stand for the chariot, drawn by two horses
or oxen)**

**rathava_hanam havirasya na_ma
yatra_yudham nihitamasya varmam
tatra_rathamupa s'agmam sadema vis'va_ha_
vayam sumanasyama_na_h**

6.075.08 The spoil borne off in his car, in which his weapons and armour are deposited, is the appropriate oblation of the warrior; therefore let us, exulting, daily do honour to the joy-bestowing car. [rathava_hanam: anas, a car or truck on which the car is placed].

Us.as' vehicle (anasah: wagon, cart)

सोदच्च सिन्धुम् अरिणान् महित्वा वज्रेणान् उषसः सम्
पिपेष् ।

अजवसौ जविनीभिर् विवृश्चन् सोमस्य ता मद इन्द्रश्

चकार ॥

2.015.06 By his great power he turned the Sindhu towards the north; with his thunderbolt he ground to pieces the wagon of the dawn, scattering the tardy enemy with his swift forces; in the exhilaration of the Soma, Indra has done these (deeds). [He turned the Sindhu towards the north: sodan~cam sindhum arin.a_t = sindhum pra_n~cam santam udanmukham akarot, he made the Sindhu being to the east, facing towards the north].

अपोषा अनसः सरत् सम्पिष्टाद् अहं बिभ्युषी ।

नि यत् सी शिश्रथद् वृषा ॥

एतद् अस्या अनः शये सुसम्पिष्टं विपाश्य आ ।

ससारं सीम् परावतः ॥

4.030.10 The terrified Us.as descended from the broken wagon when the (showerer of benefits) had smashed it.

4.030.11 Then her shattered wagon reposed (on the bank) of the Vipā_s' (river), and she departed from afar.

anas and ratha

ओ षु स्वसारः कारवै शृणोत ययौ वौ दूराद् अनसा रथेन ।

नि षू नमध्वम् भवता सुपारा अधोक्षाः सिन्धवः स्रोत्याभिः ॥

आ तै कारो शृणवामा वचांसि ययाथ दूराद् अनसा रथेन ।

नि तै नृलतसै पीप्यानेव योषा मयायिव कन्या शश्वचै तै ॥

यद् अङ्ग त्वा भरताः संतरैयुर् गव्यन् ग्रामं इषित इन्द्रजितः ।

अर्षाद् अहं प्रसवः सर्गत आ वौ वृणे सुमतिं यज्ञियानाम् ॥

अतारिषुर् भरता गव्यवः सम् अभ विप्रः सुमतिं नदीनाम् ।

प्र पिन्वध्वम् इषयन्तीः सुराधा आ वक्षणाः पृणध्वं यात शीभम् ॥

उद् व ऊर्मिः शम्या हन्त्व आपो योक्त्राणि मुञ्चत ।

मादुष्कृतौ व्येनसाध्न्यौ शून्तम् आरताम् ॥

3.033.09 Vis'va_mitra speaks: Listen, sister (streams), kindly to him who praises you; who has come from afar with a waggon and chariot; bow down lowly; become easily fordable; remain, rivers, lower than the axle (of the wheel) with

your currents. [With a wagon and chariot: anasa_rathena = s'akat.ena rathena ca, by a cart and a carriage; anas, a cart or wagon, or truck, to convey the Soma].

3.033.10 The rivers speak: Hymner, we hear your words, that you have come from afar with a wagon and chariot; we bow down before you; like a woman nursing (her child), like a maiden bending to embrace a man, (so will we do) for you. [For you: te is repeated at the end of the line; it is repeated out of respect, te iti punaruktir a_dara_rtham].

3.033.11 Vis'va_mitra speaks: (Since), rivers, (you have allowed me to cross), so may the Bharatas pass over (your united stream); may the troop desiring to cross the water, permitted (by you), and impelled by Indra, pass; then let the course appointed for your going (be resumed); I have recourse to the favour of you who are worthy of adoration. [The Bharatas: said to be the same lineage as Vis'va_mitra's: bharakulaja_madiya_h sarve; perhaps this means, those who were the bearers of Vis'va_mitra's goods and chattels; Maha_bha_rata, A_di Parva 5.3734 cites Vasis.t.ha as the family priest of the Bharatas].

3.033.12 The Bharata_s seeking cattle passed over; the sage enjoyed the favour of the rivers; streams dispensing food, productive of wealth, spread abundance, fill (your beds), flow swiftly.

3.033.13 Let your waves (rivers) so flow that the pin of the yoke may be above (their) waters; leave the traces full, and may (the two streams), exempt from misfortune or defect, and uncensured, exhibit no (present) increase. [The pin: s'amyā_, yugki_la; or, the ropes that are fastened to the ends of the yoke, the traces: yugyakan.t.ha pa_rs'va_di sam.lagna rajjavah; yoktra_n.i is also similarly explained; perhaps, these refer to the traces; exhibit no present increase: ma s'u_nam a_rata_m: s'u_nam = samr.ddhim, increase, referring merely to the present moment; i.e., may the rivers not so rise as to prevent his passage; or, it may convey a wish that the rivers might never suffer any diminution, taking s'u_nam in the sense of s'u_nyam, emptiness].

chadis (cover over a cart)

मनो अस्या अन आसीद् द्यौर् आसीद् उत छदिः ।
 शुक्राव् अनड्वाहाव् आस्तां यद् अयात् सूर्या गृहम् ॥
 ऋक्सामाभ्याम् अभिहितौ गावौ ते सामनाव् इतः ।
 श्रोत्रं ते चक्रे आस्तां दिवि पन्थाश् चराचारः ॥
 शुचीं ते चक्रे यात्या व्यानो अक्ष आहतः ।
 अनौ मनस्मयं सूर्यारोहत् प्रयती पतिम् ॥
 सूर्याया वहतुः प्रागात् सविता यम् अवासृजत् ।
 अघासु हन्यन्ते गावो ऽर्जुन्योः पयस् उह्यते ॥
 यद् अश्विना पृच्छमानाव् अयातं त्रिचक्रेण वहतुं
 सूर्यायाः ।
 विश्वे देवा अनु तद् वाम् अजानन् पुत्रः पितराव्
 अवृणीत पूषा ॥
 यद् अयातं शुभस् पती वरेयं सूर्याम् उप ।
 क्वैकं चक्रं वाम् आसीत् क्व देष्टव्यं तस्थुः ॥
 द्वे ते चक्रे सूर्ये ब्रह्माणं ऋतुथा विदुः ।
 अथैकं चक्रं यद् गुहा तद् अद्वातय इद् विदुः ॥
 सूर्यायै देवेभ्यो मित्राय वरुणाय च ।
 ये भूतस्य प्रचेतस इदं तेभ्यो ऽकरं नमः ॥
 पूर्वापरं चरतो माययैतौ शिशु क्रीळन्तौ परि यातो
 अध्वरम् ।
 विश्वान्य् अन्यो भुवनाभिचष्ट ऋतून् अन्यो विदधज्
 जायते पुनः ॥
 नवौभनवो भवति जायमानो ऽह्नां केतुर् उषसाम् एत्य्
 अग्रम् ।
 भागं देवेभ्यो वि दधात्य् आयन् प्र चन्द्रमास् तिरते
 दीर्घम् आयुः ॥
 सुकिंशुकं शल्मलिं विश्वरूपं हिरण्यवर्णं सुवृतं
 सुचक्रम् ।

आ रौह सूर्ये अमृतस्य लोकं स्योनम् पत्यै वहतुं
 कृणुष्व ॥

10.085.10 Mind was her chariot, and heaven was the covering, the two shining (orbs) were the oxen when Su_rya went to (her husband's) dwelling. [i.e., when Su_rya went to Soma].

10.085.11 Those two oxen yoked by the R.k and the Sa_man march equally; the two wheels were your ears; the moving path (was) in heaven.

10.085.12 The two swift-moving wheels were your pure (cars). Va_yu was the fastened axle, Su_rya mounted the chariot of the Mind, going to her lord.

10.085.13 Su_rya's bridal procession which Savita_despatched has advanced; the oxen are whipped along in the Magha (constellations); she is borne (to her husband's house) in the Arjuni_ (constellations).

10.085.14 When, As'vins, you came in your three-wheeled car soliciting the marriage of Su_rya, then all the gods, assented and Pu_s.an (your) son chose (you as) his parents.

10.085.15 When, lords of water, you came to the giver-away (to get) Su_rya, where was the one wheel of your car, where did you stand to make the gift?

10.085.16 Su_rya, the Bra_hman.as know your chariot wheels in their season; the single wheel that is concealed, the sages know it also. [The single wheel: the two wheels are explained as the sun and moon, the third wheel is the year].

10.085.17 I offer this adoration to Su_rya, to the gods, to Mitra and Varun.a, (and to all those) who are considerate to created beings.

10.085.18 These two (the sun and moon) wandering in thought one after the other, youthful, sportive, approach the sacrifice; one (of them) looks over all worlds, the other regulating the seasons is born repeatedly.

10.085.19 New every day (the moon) is born; the manifester of days he goes on front of the Dawns; he distributes their portion to the gods as he goes; the moon protracts a long existence. [The first half of the verse is addressed to the sun; but, the moon is the manifester of days in regulating the time of tithis (lunar days)].

10.085.20 Ascend, Su_rya, the chariot made of good kim.s'uka wood and of s'almali, multiform,

decorated with gold, well-covered, well-wheeled, prepare the happy world of the immortals, your marriage procession to your husband. [The r.ca is recited when the bride goes to the house of the husband. amr.tasya lokam = the world of immortality; or, the abode of the Soma, the object of aroha, ascend].

caturyuj (ratha drawn by four horses?)

उद् आनट् ककुहो दिवम् उष्ट्राञ् चतुर्युजो ददत् ।

श्रवसा याद्वं जनम् ॥

.006.48 The exalted (prince) has been raised by fame to heaven, for he has given camels laden with four (loads of gold), and Ya_dva people (as slaves).

[For an excellent glossary, cf. Marcus Sparreboom, 1985, *Chariots in the Veda*, (also published as Memoirs of Kern Institute, no.3; Leiden, EJ Brill); the references to many Vedic texts are found in his doctoral dissertation typescript (Rijks-Univ. of Leiden) which is the principal source for the texts referenced on this URL].

१ एवेद् इन्द्राय वृषभाय वृष्णे ब्रह्माकर्म भृगवो न रथम् ।

नू चिद् यथा नः सख्या वियोषद् असन् न उग्रो ऽविता तेनूपाः ॥

4.016.20 Therefore we offer to the vigorous Indra, the showerer (of benefits), holy adoration, that he may never withdraw his friendly (actions) from us, and that he may be our powerful protector, the defender of (our) persons, as the Bhr.gus (fabricate) a car (for use). [Bhr.gavo na ratham: bhr.gavo = di_ptas taks.a_n.ah, bright or dexterous carpenters; i.e. as a wheelwright makes a chariot for a special purpose, so the worshipper performs worship in order to secure Indra's favour].

त्यं चिद् अत्रिम् ऋतजुरम् अर्थम् अश्वं न यातवे ।

कक्षीर्वन्तं यदी पुना रं न कृणुथो नवम् ॥

10.143.01 You made this Atri, ever diligent in worship, (swift) to run to the goal like a horse, and you renewed Kaks.i_vat as (a wheelwright renews) a chariot.

RV 6.047.26-28 are hymns offered to the 'ratha'; and they indicate that the ratha was made of wood and leather:

वनस्पते वीड्वङ्गो हि भूया अस्मत्सखा प्रतरणः

सुवीरः ।

गोभिः सुलतनद्धो असि वीळ्यस्वास्थाता तै जयतु

जेत्वानि ॥

6.047.26 (Chariot made of the) forest lord, be strong of fabric; be our friend; be our protector, and be manned by warriors; you are wrapped with cow-hides; keep us steady; and may he who rides in you be victorious over conquered (foes). [gobhira_vr.tam = carmabhih parita aves.t.itam, encompassed round with hides, as if the exterior of the war-chariot especially were so strengthened.]

सुकिंशुकं शल्मलिं विश्वरूपं हिरण्यवर्णं सुवृत्तं

सुचक्रम् ।

आ रोह सूर्ये अमृतस्य लोकं स्योनम् पत्यै वहतुं

कृणुष्व ॥

10.085.20 Ascend, Su_rya, the chariot made of good kim.s'uka wood and of s'almali, multiform, decorated with gold, well-covered, well-wheeled, prepare the happy world of the immortals, your marriage procession to your husband. [The r.ca is recited when the bride goes to the house of the husband. amr.tasya lokam = the world of immortality; or, the abode of the Soma, the object of aroha, ascend].

Reins are mentioned:

उत् पूषणं युवामहे ऽभीशूङ्ख सारथिः ।

मह्या इन्द्रं स्वस्तये ॥

दराथ तखुस । डखर खुर गरोत थेलडारे । पुम्स ॥ न

नद निदरा ।

चहारखितेर चपुललस तगिहतफ हसि रेनिस ॥

यूयं धूर्ध्रु प्रयुजो न रश्मिभिर् ज्योतिष्मन्तो न भ्रासा
व्युष्टिषु ।

श्येनासो न स्वयंशसो रिशादसः प्रवासो न प्रसितासः
परिप्रुषः ॥

10.077.05 You (move along) like horses harnessed to the chariot-poles with reins; at break of day you (are endowed) with radiance like the luminaries (of heaven); you are like hawks, like the destroyers of foes, desirous of renown; you cover the ground like travellers, you move everywhere.

RV seems to indicate that the ratha had solid wheels (RV 1.034.02), had provision for seats for passengers (RV 1.064.09); an axle (aks.a RV 1.166.09). The axle might have been made of a copper-alloy (e.g. copper + arsenic or zinc), not necessarily bronze in R.gvedic times.

वीळुपत्मभिर् आशुहेमभिर् वा देवानां वा जूतिभिः
शाशदाना ।

तद् रासभो नासत्या सहस्रम् आज्ञा यमस्य प्रघने
जिगाय ॥

1.116.02 Na_satyas, borne by strong and rapid (steeds), and (urged) by the encouragements of the gods, the ass of you, thus instigated, overcame a thousand (enemies) in conflict, in the war grateful to Yama. [The ass: An ass (ra_sabha) given by Praja_pati. The chariot of the As'vins is drawn by two asses (ra_sabhavas'vinoh) (Nighan.t.u 1.14); or, it may mean, 'one going swiftly', and the rest of the passage, 'obtained precedence for the As'vins over other gods in the oblation, through his mastering the stanzas declared by Praja_pati'].

ओ षु स्वसारः कारवै शृणोत ययौ वौ दूराद् अनसा
रथेन ।

नि षू नमध्वम् भवता सुपारा अधोक्षाः सिन्धवः
स्रोत्याभिः ॥

3.033.09 Vis'va_mitra speaks: Listen, sister (streams), kindly to him who praises you; who has come from afar with a waggon and chariot; bow

down lowly; become easily fordable; remain, rivers, lower than the axle (of the wheel) with your currents. [With a wagon and chariot: anasa_rathena = s'akat.ena rathena ca, by a cart and a carriage; anas, a cart or wagon, or truck, to convey the Soma].

विश्वानि भद्रा मरुतो रथेषु वो मिथस्पृध्यैव तविषाण्य
आहिता ।

अलतसेष्व् आ वः प्रपथेषु खादयो ऽक्षो वश् चक्रा
समया वि वावृते ॥

1.166.09 Maruts, all good things are in your cars; on your shoulders abides emulous strength; at your resting-places on the road refreshments (are ready); the axle of your (chariot) wheels holds them firmly together. [At your resting places: prapathes.u kha_dayah, an indication of facilities for shelter and provisions to travellers].

या सुरथा रथीतमोभा देवा दिविस्पृशा ।

अश्विना ता हवामहे ॥

1.022.02 We invoke the two As'vins, who are both divine, the best of charioteers, riding in an excellent car and attaining heaven.

त्रयः पवयो मधुवाहने रथे सोमस्य वेनाम् अनु विश्व

इद् विदुः ।

त्रयं स्कम्भासं स्कभितासं आरभे त्रिं न याथस् त्रिं व
अश्विना दिवा ॥

1.034.02 Three are the solid (wheels) of your abundance-bearing chariot, as all (the gods) have known (it to be), when attendant on Vena, the beloved of Soma; three are the columns placed (above it) for support, and in it thrice do you journey by night, and thrice by day. [As'vins went to the marriage of Vena with Soma and loaded their ratha (chariot) with goodies; skambhasah skabhita_sa a_rabhe = posts standing up from the body of the car, which the riders held, to avoid being thrown off by the rapid or uneven motion of the car].

रोदसी आ वदता गणश्रियो नृषाचः शूराः

शवसाहिमन्यवः ।

आ वन्धुरेष्व् अमतिर न दर्शता विद्युन् न तस्थौ मरुतो
रथेषु वः ॥

1.064.09 Maruts, who are distinguished in troops, who are benevolent to men, who are heroes, and whose strength is deadly in your anger, you make heaven and earth resound (at your coming); your (glory) sits in the seat-furnished chariots, conspicuous as (a beautiful) form, or as the lovely lightning.

युञ्जन्त्य् अस्य काम्या हरी विपक्षसा रथे ।

शोणा धृष्णू नुवाहसा ॥

1.006.02 They (the charioteers) harness to his car his two desirable coursers, placed on either hand, bay coloured, high-spirited, chief-bearing. [Horses of Indra are called hari (Nirukta 1.15.1), perhaps, of yellow colour; s'on.a_ = crimson colour; vipaks.asa_ = harnessed on different sides (of the chariot or pole (?)).

इन्द्रं विश्वा अवीवृधन् समुद्रव्यचसं गिरः ।

रथीतमं रथीनां वाजानां सत्पतिम् पतिम् ॥

1.011.01 All our praises magnify Indra, expansive as the ocean, the most valiant of warriors who fight in chariots, the lord of food, the protector of the virtuous. [samudra vyacasam = samudra vad vya_tavantam, spreading or pervading like the ocean; Indra, as the firmament is universally diffused].

आ देवानाम् अभवः केतुर अग्ने मन्द्रो विश्वानि

काव्यानि विद्वान् ।

प्रति मर्ताववासयो दमूना अनु देवान् रथिरो यासि

सार्धन् ॥

3.001.17 You, Agni, are the commendable announcer of the gods, cognizant of all sacred rites; placid, you abide among mortals, and, like a charioteer, you follow the gods, accomplishing (their wishes).

मन्द्रं होतारं शुचिम् अद्वयाविनं दमूनसम् उक्थ्यं

विश्वचर्षणिम् ।

रं न चित्रं वपुषाय दर्शतम् मनुर्हितं सदम् इद् राय
ईमहे ॥

3.002.15 We solicit wealth of the adorable (Agni), the invoker of the gods, the pure, the single-minded, the munificent, the commendable, the beholder of all, who is many-coloured like a chariot, elegant in form, and always friendly to mankind.

ऐभिर् अग्ने सर्र याह्य अर्वाङ् नानारथं वा विभवो ह्य
अश्वाः ।

पत्नीवतस् त्रिंशतं त्रीश च देवान् अनुष्वधम् आ वह

मादयस्व ॥

3.006.09 With all these in one chariot, Agni, or in many (chariots), come to our presence, for your horses are able; bring the three and thirty divinities with their wives, for the sake of (the sacrificial) food, and exhilarate them (all with the Soma). [The three and thirty divinities with their wives: patni_vatas trim.s'atam tri_m.s'ca deva_n: the first is, literally, having wives, but sometimes considered a proper name].

वैश्वानरम् मनसाग्निं निचाय्या हविष्मन्तो अनुषत्यं

स्वर्विदम् ।

सुदानुं देवं रथिरं वसूयवो गीभी रण्वं कुशिकासो

हवामहे ॥

3.026.01 We of the race of Kus'ika offering oblations, desirous of wealth, having contemplated him in our minds, invoke with praises the divine Vais'va_nara, the observer of truth, the cognizant of heaven, the bountiful, the charioteer, the frequenter (of sacrifices). [Observer of truth: anusatya_: from anu and satya; the notion is not that of observing truth in the abstract, but of keeping faith with the sacrificer, by giving him the desired recompense to which he is justly entitled].

इन्द्राय गिरो अनिशितसर्गा अपः प्रेरयं सगरस्य

बुध्नात् ।

यो अक्षेणेव चक्रिया शचीभिर् विष्वक् तस्तम्भ

पृथिवीम् उत द्याम् ॥

10.089.04 I will utter praises to Indra in unceasing flow, (I will send) waters from the depth of the firmament (to him) who has fixed heaven and earth on both sides by his acts as the wheels of a chariot (are fixed) by the axle. [Note the rare use of 'cakra' to denote the wheel ?of a chariot].

Did the ratha have spoked-wheels (pradhi = fellies; s'an:ka = spoke; nabhi = axle)? It is unclear from the R.gveda if a spoked-wheeled ratha is described. In RV 1.164.48 the astronomical phenomena are elaborated, perhaps in terms of 12 months of a year and 360 days of a year

द्वादश प्रथयश् चक्रम् एकं त्रीणि नभ्यानि क उ तच्
चिकेत ।

तस्मिन् साकं त्रिशता न शङ्खवो ऽर्पिताः षष्टिर् न
चलाचलासः ॥

1.164.48 The fellies are twelve; the wheel is one; three are the axles; but who knows it? within it are collected 360 (spokes), which are, as it were, moveable and immovable. [The wheel is the year of twelve months; the three axles are the three double seasons, or hot, wet and cold; and the three hundred and sixty spokes are the days of the lunar-solar year; stanah s'as'ayah, s'aya_na, sleeping; dehe
vartama_nah, abiding in the body].

There is a metaphor about the sun's wheel (cakram); does the metaphor extend to wheels of the sun's chariot:

अस्य सुवानस्य मन्दिनस् त्रितस्य न्य् अर्बुदं वावृधानो
अस्तः ।

अवर्तयत् सूर्यो न चक्रम् भिनद् वलम् इन्द्रो

अङ्गिरस्वान् ॥

2.011.20 Invigorated (by the libation) of the exulting Trita, offering you the Soma, you have annihilated Arbuda; Indra, aided by the An:girasa,

has whirled round his bolt, as the sun turns round his wheel, and slain Bala. [As the sun turns round his wheel: su_ryo na cakram; if na is used in the negative sense, the phrase means: when the sun did not turn his wheel or stool still through fear of the asura; or, that Indra whirled the wheel like the sun, having taken one of the wheels of the sun's chariot as a weapon against Bala].

द्वे ते चक्रे सूर्ये ब्रह्माण ऋतुथा विदुः ।

अथैकं चक्रं यद् गुहा तद् अद्वातय इद् विदुः ॥

10.085.16 Su_rya, the Bra_hman.as know your chariot wheels in their season; the single wheel that is concealed, the sages know it also. [The single wheel: the two wheels are explained as the sun and moon, the third wheel is the year].

त्वा युजा नि खिदत् सूर्यस्येन्द्रश् चक्रं सहसा सद्य
इन्दो ।

अधि ष्णुना बृहता वर्तमानम् महो द्रुहो अप विश्वायु

धायि ॥ 4.028.02 With you, Soma, for his ally,

Indra has quickly taken off by force the wheel ?of the chariot of the sun, abiding above with the vast and stationary (firmament); the everywhere going wheel (of the car) of the great oppressor has been taken away. [mahodruho = prabhutasya drogdruh, of the very mighty oppressor or tyrant, alluding probably to his heat].

उत स्म ते परुष्याम् ऊर्णा वसत शुन्ध्यवः ।

उत पुव्या रथानाम् अद्रिम् भिन्दुन्त्य् ओजसा ॥

5.052.09 Whether they (abide) on the Parus.n.i (river), or, purifying (all), they clothe themselves with light, or whether they break through the clouds with strength by the wheels of their chariots. (The term generally used to denote a chariot-wheel is pavi (the circumference of a wheel, a metonymy for a wheel), not cakram, which is commonly used in reference to the sun's wheel). See also RV 5.062.02 for the use of pavi. The R.ca 6.062.10, however, does use the word 'cakra' -- antaraish' cakraish -- in reference to ratha of the As'vins; the reference to cakram of Su_rya may therefore be a reference to the wheel of his

chariot, a metaphor used to explain the concept of time and cosmology:

अन्तरैश् चक्रैस् तनयाय वर्तिर् द्युमता यातं नुवता
रथेन ।

सनुत्येन त्यजसा मर्त्यस्य वनुष्यताम् अपि शीर्षा
ववृम् ॥

6.062.10 Come with your shining and well-guided chariot, (fitted) with excellent wheels, to our dwelling, (to bestow upon us) male offspring; cut off with secret indignation the heads of those obstructing (the adoration) of the mortal (who worships you). [Well-guided chariot: nr.vata rathena, having a leader, a driver; or nr. may mean a horse; with excellent wheels: antaraś'cakraiḥ: anikr.s.t.aih, with not inferior wheels; with secret indignation: sanutyena tyajasa_ = tirohitena krodhena].

A reference to the spokes of wheels (ara_h) occurs in a hymn to the Marudgan.a, in RV 10.078.04 (R.s.i, Syu_maras'mi Bha_rgava):

रथानां न ये राः सनाभयो जिगीवृलतसो न शूरा
अभिद्यवः ।

वरेयवो न मर्या घृतघृषो ऽभिस्वर्तारो अर्कं न सुष्टुभः ॥
10.078.04 Who (are) united to a common centre like the spokes (of the wheels) of chariots, brilliant like victorious heroes, sprinkling water like benevolent men, sweet-voiced like men who recite praise.

अग्ने नेमिर् अराइव देवृलतस् त्वम् परिभूर असि ।

आ राधश् चित्रम् ऋञ्जसे ॥

5.013.06 Agni, you encompass the gods as the circumference (surrounds) the spokes (of a wheel); bestow manifold wealth upon us.

The following r.ca evokes the Mesopotamian model chariot showing a quiver for holding arrows:

त उग्रसो वृषण उग्रबाहवो नकिष् टनूषु येतिरे ।

स्थिरा धन्वान्य् आयुधा रथेषु वो ऽनीकेष्व् अधि
श्रियः ॥

8.020.12 Fierce, vigorous, strong-armed, they need not exert (the energy of their) persons; bows and arrows are ready in your chariots; the glory (of conquest) over (hostile) armies is yours. [Energy: or, rather, they need not exert themselves to defend their persons, nakis.t.anu_s.u yetire].

vi “As an example of the literary evidence, in relation to the use of iron in the Kumaun region, may be cited the widespread use of words as prefixes / suffixes in the local dialects and languages, relating to iron. These words point to the importance of iron metallurgy in Kumaun. Words like *Lo, Lu, Loha*, etc. are directly related to iron. The word *Agar*, on the other hand, relates to mines and mining activities. Place names related to iron are Lohaghat, Loharkhet, Lob, Lukhani, and Assurchula etc. The word *Asur* has direct reference to the iron using tribes spread over a wide area in north India, like Bihar. The *Asur* folklore tradition is very strong in Kumaun and an early King Banasur is associated with the old iron site of Lohaghat.

“The *Himalayan Gazetteer* (Atkinson) mentions a legend popular amongst the ironworkers on the borderland of Garhwal, which relates Kalia Lohar, whose ancestors forged the armaments for the Pandavas of the *Mahabharat*. As a mark of respect to the legendary hero the workers to this day set aside five pieces of coal before they begin work on iron. The legend may point to the antiquity of iron technology in the region...

“Vibha Tripathi (2001) in her recent book – The Age of Iron in South Asia – writes that the northernmost parts of Kumaun – Garhwal Himalayas have hematite and limonite ores in the Tertiary and the earlier sedimentary deposits, especially at Chamoli, Nainital and Almora region. She also speculates that the early inhabitants of the Upper Ganga Plain must have exploited these deposits. She further reports that in Nainital District iron ore of all grades is found near Lusgiani and hematite occurs near Khairna. Almora also has hematite of red and brown

variety and has recently yielded megaliths and iron working remains. Atkinson in his Gazetteer says that iron mines were in Agar patti of Ramgarh pargana and the principal mines were Lusgiani, Nathuakhan ,Gulla and Satbunga, Patti Lakhanpur in Chaugarkha pargana, patti Darun, the mines Digatia and Thiratoli, Rangor patti at Jalal and Digarhia. Patti Kharahi at Lob.Patti Giwar in pargana Pali at Chiteli, Simelkhet , Gudi , Bailgaon , Mahakhauri and Tilwara.” (D.P. Agrawal and Manikant Shah, 2002, *Iron In Kumaun Goes Back To First Millennium BC*).