

CHAPTER II

MINERALS AND METALS IN THE RGVEDA

The R̥gveda (Rv) is the oldest Indo-Aryan literary document available to us. Before we discuss the metals and minerals mentioned in the R̥gveda, we may briefly comment on the controversial views on its authorship and date of compilation.

Max Müller, the famous scholar and translator of the R̥gveda, noticed the similarities between the Indo-European languages and proposed in 1859, that R̥gveda was compiled around 1200 B.C. by the Aryans 'who had come to India from outside around 1500 B.C.' (Max Muller, 1859). His theory was shown by Winternitz, Bühler, Macdonnel, Muir etc. to be based on very flimsy premises. John Muir asserted in 1872 that the R̥gvedic Aryans were not aware of any land outside India, and also that 'the nations whose speech is derived from Sanskrit have sprung from the gradual dispersal of the ancient Aryan race of India' (Muir, 1872: 2, 322-323). The most recent rebuttal of Max Müller's dates has been recorded by K.C. Varma (1987). We agree with Winternitz that 'no power on earth can anytime be sure whether the Vedic hymns were composed 1000 or 2000 or 3000 years before Christ'. As a matter of fact, the ^{verses} were orally transmitted through centuries, and the only question is: in which era in the pre-history did the events, narrated in the verses, actually ^{take} ~~took~~ place.

Our considered opinion is that the R̥gveda corresponds to the ancient civilization on the valley of the lost river. (vinasana)

Sarasvati (Biswas, 1987). The archaeological expeditions have unearthed not only the ancient course of the said river (Stein, 1942; Ghose et al, 1979) but also the details of many important sites on the river such as Kalibangan (Lal, 1979), Banawali (Bisht, 1982), Bhagwanpura (Lal, 1982) etc. C-14 measurements have shown that the different strata of the above settlements ranged from 3000 to 1500 B.C. In other words, the Rgvedic culture was Pre-, Mature- as well as Post-Harappan. We agree with B.B. Lal (1982:337) that the uninterrupted sequence from the Pre-Harappan ploughed field to the post-Harappan PGW 'formed the base on which the Mature Harappan appeared like bubbles on a vast lake, only to disappear and merge into the waters of the lake itself'.

In other words, we consider that the myth of 'foreigner Aryans invading India and ^{de}stroying the totally different Harappan culture' is fictitious, unproven and unacceptable. Many scholars have provided arguments as to why the myth cannot be accepted at the present level of our knowledge (Dales, 1964; Poliakov, 1974; Shaffer, 1984; Srivastava, 1984; Biswas, 1988).

It appears more likely that the Rgvedic civilization was indigenous and, flourishing on the banks of the Sarasvati and its tributaries such as Drishadvati, Satadru or Sutlej, was neolithic or mesolithic in the Pre-Harappan, and Chalcolithic during the Mature Harappan era. Its economy was essentially agro-rural when it came into contact with the economically exploiting class of the

Panis or Harappan traders. The Rgvedic war was basically a civil war fought around 2500-2000 B.C. and won by the authors of the Rgveda. Their opponents belonged to the same racial stock but different religious sect. As the Sarasvati river got dried up, the Rgvedic people moved towards the eastern valley of Gangā and Yamunā and continued with the later part of the Vedic civilization, lasting upto 800 B.C. and heralding the onset of the second urbanisation and the Historical Period in India.

Transition from the Neolithic to the Chalcolithic Age

The Rgveda is not a manual on metallurgy, and hence we cannot expect too many details on minerals and metals in this earliest literature of the mankind. Yet we do obtain here a glimpse into the transition from the neolithic to the chalcolithic age in India.

The Rgveda (Rv) contains several words for the stone: asman, adri, pāsya etc., of which the first i.e. asman is the most significant one. Mehta and Kantawala (1987) have discussed the varieties of stone-tools in the Rgveda. In Rv. 1.191.15 the text bhinadmy asmanā indicates a cutting stone-tool which could be a blade, celt or cleaver. The asmānam vajram (Rv. 4.22.1) is evidently a vajra or weapon made of stone. Later a similar weapon was made of ayasa or metal. The simultaneous appearance of the words Kāmāra and asman in 9.112.2 led Mehta et al (1987) to propose that Kāmāra was a stone-worker rather than a blacksmith. It may be

recorded here that in the Pre-Harappan stratum of Kalibangan, chalcedony and agate blades have been found. These were serrated, mounted on wooden handle and probably used for cutting and sowing. At a later stage, chert blades were introduced. Side by side copper-made axe and parasu were found, the latter probably used for cutting scrubby bushes (Lal, 1979:70). Chert and Chalcedony blades have been found at Banawali also (Bisht, 1982).

The vāsi in the Rgveda is probably an adze with a flat surface and a sloping edge for cutting or rough shaping of wooden materials. Its modern equivalent could be the carpenter's basulā (Hindi). Mehta et al (1987) have pointed out that whereas basulā Rv 10.101.10 refers to asmanmayī vāsi or stone-made implement, Rv 8.29.3 mentions vāsim āyasim or a metallic axe. Sāyana explains that this could be a stone adze with a metallic edge.

Fire in Metallurgy

It is evident that the transition from the neolithic to the chalcolithic age has been subtly depicted in the Rgveda. This transition was possible only through the discovery and use of fire. Generation of fire by friction (3.29.1), and its sustenance by the fire-wood (arani) and the fuel wood (atas) have been described in the Rgveda (vide Appendix B - reference to agni, atas and arani).

Agni or fire has been described as the cradle of (metallic) gems: ratnadhātanam (1.1.1). Here quite evidently, ratna or gem stands for metallic gems like gold and silver. These two metals

and also copper have been known to exist in the native or metallic state. It is quite likely that Man obtained these three metals in the chalcolithic age solely by melting the ore, using fire and some kind of furnace. At a later stage, copper = ores (sulphide or oxide) were smelted or reduced to the metallic state by using fuel wood or atas, the carbonaceous matter in it serving as the fuel as well as the reductant.

The valuable ore body has been known in the Vedic literature as nidhi (Rv 2.24.6 etc.). Mining was known in elementary form. The mined product khanitrima (7.49.2) was obtained by using digging tool or khanitra (1.179.6). Grinding (1.28.4), using musala or pestle and ulukhala or mortar (1.28.1-6) was done before the ore-body was put into the furnace.

We have indicated before the controversy as to whether Kāmāra in 9.112.2 stands for stone-worker or blacksmith. May be there was no fine distinction between the two professions in the Rgvedic age. Kāmāra in Rv. 10.72.2 was however clearly a metal-smith who blew in a furnace and made metal objects presumably by casting of molten metal. He is associated with the act of blowing (dhama) in a furnace in order to purify or prepare the metal (Rv. 4.2.17, 10.72.2), and was therefore known as dhmātari or one who blows (5.9.5).

ध्माते व ध्मति शिशित् ध्मातरी यथा (5.9.5)

ब्रह्मणस्पतिरेता सं कर्मा इवाधमत् (10.72.2)

The metallic gem thus obtained by the smelting or melting process was known as dravina (4.5.11, 4.23.4 etc.) and the smelter was known as the melter or dravi (6.3.4) also.

The Meaning of Ayas

The sūkta 9.112.2 has been referred to earlier. The full text reads:

जरतीभिः औषधीभिः पर्णैभिः शकुनानाम्
कर्मरौ अश्मभिः द्युभिः हिरण्यवन्तम् इच्छति (9.112.2)

Mehta et al (1987) felt that Kārmāra here could mean a stone-worker. Banerji (1929) however accepted Schraeder's earlier suggestion that the hymn actually described a smithy. Banerji argued that the passage alludes to the making of carburised iron. The Rgvedic smith, according to Banerji, used to convert the bright quartzian magnetic stone of iron oxide to iron through reduction by the carboneaceous dried medicinal plant, and then to carburise it by fusing with birds' wings.

Indirectly, Banerji proposes that the word ayas in the Rgveda means iron. We do not subscribe to his views. Iron was not discovered in the age of the Rgveda. The Sarasvati valley archaeological sites have not yielded any iron specimen. Iron appeared in India much later, around 1200 B.C.

The word ayas in the Rgveda (1.57.3, 1.163.9, 4.2.17, 6.3.5, 10.53.9-10 etc.) means metal in general, and not iron in particular. In the Rgvedic age it probably corresponded to copper

and its alloys. In the subsequent Vedic literature, copper was mentioned as the red metal and iron as the black metal. This also proves that ayas in the Rgveda could not mean iron specifically. We would propose that the hymn 9.112.2 might have alluded to the making of copper metal through the reduction of its ore or simply to the melting of gold-bearing quartz. The end product of golden ornament, copper implement or copper-tipped arrow were sold to the moneyed people by the metalsmiths.

The words āvasī and ayasmaya meant metallic commodity, and fire was characterised as ayodanstra (1.88.5, 10.87.2), that which bites metal.

Some Metallic Objects

For agriculture, the Rgvedic people used plough which had various names e.g. phāla (4.57.8, 10.117.7), lāṅgala (4.57.4), vrka (1.117.21, 8.22.6), sīrā (4.57.5 & 8, 10.101.3-4). Sītā (the name of the heroine in Rāmāyaṇa) means the line or furrow titled by the plough. The tip of the plough known as phalā or sunā (4.57.5 & 8) might have been made of sharp^e stone during the neolithic age, but was metallic in the chalcolithic era. Sickles-dātra (8.78.10) and srñī (10.101.3) - were used for cutting the crops.

Next to the ploughshare, the most important metallic tool in the hands of the Rgvedic people were the axe and the chisel or the adze which were used to cut the forest trees and utilised as the

carpenter's tool. We have earlier discussed that chisels or adzes, vāsi or basulā were stone-made in the neolithic age (10.101.10) and became metallic in the chalcolithic age (8.29.3). Krti was a chopper or cutter (1.92.10, 1.168.3), more like a sword, and eventually developed as a scissor. Swadhiti (2.39.7, 3.8.11) was a similar instrument. The name sounds similar to sword. Bhurija (4.2.14, 8.4.16, 9.71.5) was a carpenter's tool used in the making of chariots.

Kulisa (1.32.5) was the axe, the modern Kulhade or Kuthāra. Parasū, also a sharpened metallic axe, was an offensive weapon. The cow-plunderers 'came to the east with big parasū' to attack the Rgvedic people (7.83.1). Vadhara and Heti were also weapons, the details of which are not known.

Several names were used to indicate an arrow: isu, bāna, bunda, saru, sarya, saryā, saru and sāvaka. Copper-tipped arrows were evidently not enough to kill the enemy, and therefore poisonous materials were used on the tips: आलाक्ता अयोमुखम् इषु (6.75.15). There were several kinds of javalins or spears to be thrown at the enemies: srka (srja means to let go or fly), pavi (10.180.2), rsti (1.37.1, 1.64.4, 8.20.11 etc.). The action is clearly conveyed in the text ऋषीः असृक्षत (5.52.6). Vajra (1.32.2, 1.51.7, 6.23.4) was probably a spear or a barbed harpoon. The metal spike (sūla 1.162.11) and the knife (sūna 1.162.13) could be used either for offensive combats or in connection with cooking.

Closer to the domestic scene, we find the uses of the razor (Ksura 1.166.10, 10.142.4), needle (vesi 7.18.17 and sūci 2.32.4),

(some metallic) pitchers (āhāva, kalasa and kumbha) and some musical instruments such as āghāti (10.146.2) or cymbal and karkari (2.43.3) or lute.

Some of the copper implements actually found in the Sarasvati valley sites are:

at Kalibangan - celt, hammer, bangle, arrow, fish-hook, axe, parasu, mirror, pin (Lal, 1979).

at Banawali - arrowhead, bangle, spearhead, sickle blade, razor, chisel, ring, double spiralled and simple pin, ear/nose ring/ fish-hook (Bisht, 1982).

The Sarasvati valley copper artefacts were not alloyed with tin, and therefore not as hard as those from Harappa and Mohenjodaro.

Ornaments and Gems

In the Rgveda, silver has been mentioned only once (rajata 8.25.22). The Sarasvati valley has been far from the sources of silver. The Indus system of rivers however provided bank sands containing alluvial gold particles. These rivers were called hiranyavartani (6.61.7, 8.26.18, 10.75.8), the golden ways.

Quite naturally, the Rgveda contains references to many golden objects such as a pitcher made of gold (1.117.12). Khādi was the general term for golden ornaments: bracelet, armlet or bangle हस्तेषु रवादि (1.168.3) रवादि हस्तं (5.58.2), anklet पत्सु रवादयो (5.54.11), shoulder decoration

अंसेषु खादयो (7.56.13) etc. On the finger, khādi was known as vr̥sakhādi or ring (1.64.10). Amulet or kavaca was also known as pratvatkān (5.55.6). The golden crown or tiara was known as śiprā; this was worn on the forehead:

शिप्राः शीर्षसु वितता हिरण्ययीः (5.54.11, 8.7.25)

Rukmā was defined as the chest ornament made of gold:

वक्षसु रुक्मा (5.54.11).

Gold ornamental pieces to decorate neck were known as niska (2.33.10). Niskagrība meant golden necklace (5.19.3). There was no minted money or golden coin during the Rgvedic era, but possibly niska, as a golden lump, often served as the barter or exchange unit of money (1.126.2, 4.37.4, 5.27.2).

Anji (5.53.4) and swadhā (4.10.6) were certain kinds of ornaments, the details of which are not known. Karnasovana (8.78.3) was evidently the golden ornament for the ear. Excavations at Banawali have yielded gold necklaces, gold beads and gold-plated terracotta beads (Bisht, 1982).

The Rgveda refers to gems or ratna several times starting from its very first hymn (1.1.1). The other name of gem was mani, that which decorates (mandana). Gems other than metallic gems were specially recognised.

हिरण्येन मणिना जुम्भमानाः (1.33.8)

हिरण्यकर्णं मणिग्रीवम् (1.122.14)

The latter reference alludes to golden ear-ring and a necklace made of gems the like of which has been found at Banawali (Bisht, 1982). The Rgveda does not discuss different kinds of gems but at least one, namely pearl or krsana has been specifically mentioned: अमिवृतं कृशनी (1.35.4).

Archaeological excavations at Kalibangan have yielded bangles of copper, shell and terra-cotta, beads of shell, copper, agate and carnelian, copper mirrors, ivory combs etc. At Banawali we find in ^{the} Pre-Harappan level beads of gold, semi-precious stones, steatite (including disc beads), faience, shell, bone and clay; bangles of shell, faience and copper. At the Mature Harappan level, a jewelry dealer's large house has been excavated. This was found to contain beads of etched ^a carnelian, gold and lapis lazuli. Also found were gold-plated terracotta beads and numerous steatite seals. At Banawali, beautiful golden ornaments and finely cut smoky brown crystal stones showed the heights of fine gem craftsmanship. Evidently this river-port was an important and prosperous trading centre. During the Post-Harappan period, the cultural pattern changed at Banawali. The Harappan seal, chert weights, steatite disc beads etc. disappeared. The Indus economy had collapsed. But the qualitative and quantitative profusion of faience ornaments such as bangles, anklets, rings, beads and pipal leaf-shaped earrings continued to meet the local requirements. The faience items had noteworthy and shiny silvery coatings.

Concluding Remarks

There is thus reasonable correlation between the Sarasvati Valley archaeological data, that we have gathered in India after independence, and the information in the Rgveda. The Pre-Harappan Sothi culture that had evolved in the Sarasvati Valley was influenced by the later day Harappan, and yet the original setting of the Rgvedic culture was retained even after the demise of the Harappan civilization. The clay stele Shiva lingas, the fire-worship, the animal sacrifice as religious ritual, and the segregation of population (along caste lines?) at Kalibangan clearly show the Rgvedic culture. Mother Goddess and ram figurines at Banawali and Bhagwanpura indicate the Sarasvati cult. The panis or the merchants at Banawali became parts of the Rgvedic culture representing islands of affluence in an ocean of agro-rural setting. Gamesman type of ivory or bone cubes remind one of the Rgvedic poetry related to a dice player (10.34.1-14). The merchants used to bring lapis lazuli from Afghanistan or Persia, etched carnelian beads from Gujarat and Copper celts from Ganeswar-Jodhpura in Rajasthan.

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