

Material Culture and Philology: Semantics of Mining in Ancient India

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For readers of *JAOS* the bold claim made in an otherwise sympathetic article by Michelle R. Warren may come as a surprise: “Philology has been more often irrelevant than controversial within mainstream critical debates. With the expansion of electric technologies and the fragmentation of the nationalist disciplines that first nurtured philology, its demise may seem more certain than ever. Roberta Frank has pointed out that some dictionaries boldly declare that the word is no longer in use.”¹ It did come as a surprise to learn that what I have been doing for four decades is not only dead but the very word has been rendered obsolete! But, to paraphrase Mark Twain, the death of philology has been greatly exaggerated. There is no better way to show this, and to demonstrate not just the vitality but also the indispensability of philology for studying the cultural history of the past and in a special way the material culture of the past from which critics say it is divorced, than to do a bit of philology. That is the aim of this paper.

Philology, as we know—and here I may be preaching to the choir—actually deals with the real world of the past, where words and texts are the windows into the social, religious, economic, and political histories for which we often have little other evidence. Words are often the only artifacts these societies have left. Philology, philologically, is, of course, the “love of words.” And the word, actually two words, for our attention relate to a central area of ancient Indian society and economy and of its material culture, and that is mining. The importance of mining to the ancient Indian economy and material culture is well known and need not be rehearsed here. Mining produced all the metals, including iron, that anchored activities as diverse as clearing forests, agriculture, warfare, and construction. Mines also produced the raw material for luxury goods, including gold, silver, and precious stones, that anchored cultural expressions of beauty in ornaments and jewelry.

The earliest literary evidence for metals and metallurgy has been collected by Wilhelm Rau (1974) in his important study of metals and metal objects in Vedic India. Unfortunately, although it provides a wealth of information about metal objects and weapons, it tells us little about how metal was extracted from the ground, about the technologies of mining. The sole reference to a mine is in the rather late text, the *Maitrāyaṇīya Upaniṣad* 6.28 (Rau 1974: 26), which uses the term *avaṭa* for a mine.² In describing the passage of a person along the path to Brahman, the text gives the example “as a miner in search of minerals enters a mine” (*avaṭaivāvaṭakṛd dhātukāmaḥ saṃviśaty evam*). However, I have not encountered this word with the meaning of ‘mine’ in other literature.

A little-noticed fact regarding ancient Indian metal culture is that there are two common and strikingly different words in Sanskrit for mine: *khani* and *ākara*. I think that a close examination of these two terms and their semantic histories will shed light on the mining

1. “Post-Philology,” in *Postcolonial Moves: Medieval through Modern*, ed. Patricia Clare Ingham and Michelle R. Warren (New York: Palgrave Macmillan, 2003), 19.

2. van Buitenen (1962) places this passage within the sections that he considered later interpolations.

technologies of ancient India, on Sanskrit imagery and metaphors based on mining, and, importantly, on the dating of ancient Indian texts.

If mining requires digging into the ground, as it generally does, then *khani*, derived from the verbal root \sqrt{khan} to ‘dig’, would seem to be the obvious choice. That, however, is not the case. This term is absent in an impressive list of classical Sanskrit texts: *Rāmāyaṇa*, *Mahābhārata*, and all the dharmasāstras. Indeed, the Petersburg Dictionary, because it did not have access to Kauṭilya’s *Arthaśāstra*, could only refer to late sources and lexicons for this term, the earliest being Kālidāsa’s *Raghuvamśa* (17.66; 18.22). The most common term for mine in the classical texts is *ākara* (from the verb \bar{a} $\sqrt{k\bar{r}}$), meaning something like a place of scattering, or a place where things are scattered or lying around. As I have shown elsewhere (Olivelle 1997: 174 n. 1), the \bar{a} prefix often indicates the place of an activity, as in *ārāma*, *āsrama*, and *ānanda*. Perhaps the word had the meaning of deposit, as in “gold deposit,” that is, a place where a concentrated amount of a metal or gems is located. The use of these two terms in ancient texts may give us valuable insights into both the changes in the technology of mining in ancient India and the compositional histories of texts using these two terms.

My principal focus here is on Kauṭilya’s *Arthaśāstra*, clearly one of the—if not *the*—most important source for ancient Indian society, economy, and material culture. This text is unique in that it uses both terms a substantial number of times, certainly more than any other ancient Indian text: *khani* 24 times and *ākara* 12 times. The term *khani* is found both in the first half of the *Arthaśāstra* devoted to domestic affairs and known as Tantra (Books 1–5) and in the second half dealing with foreign affairs and known as Āvāpa (Books 6–14), while *ākara* is found only in the first half.

khani

Tantra: 1.10.15; 2.6.1, 4; 2.11.38; 2.12.27, 36; 2.22.10; 2.28.6; 2.35.11; 4.1.51; 4.9.2; 5.1.39; 5.2.3.

Āvāpa: 6.1.8; 7.1.20; 7.11.10 (twice); 7.11.12; 7.12.13 (twice); 7.12.25; 7.14.25; 7.16.10; 9.4.8.

ākara

Tantra: 1.13.21; 1.18.8; 2.1.19; 2.1.39; 2.12.1 (twice), 20, 22, 37; 2.13.3, 9; 4.8.29.

While *khani* is spread throughout the entire text, the situation is quite different in the case of *ākara*. First, the term is conspicuous by its absence in the second half of the *Arthaśāstra*. Even in the first half, it is mostly confined to Chapter 12 of Book 2, a chapter devoted to the *ākarādhyakṣa*, the superintendent of mines. The three occurrences of the term in the first book of the *Arthaśāstra* and in 2.1.19 are all in the compound *ākarakarmānta*, factories attached to *ākaras*. At 2.13.3 and 9 we have the reference to a kind of gold that is *ākarodgatam*, originating from *ākaras*. Two of the other occurrences of *ākara* (2.12.37 and 4.8.29) are in verses that conclude chapters, verses that were later introductions by a redactor (Trautmann 1971: 75; McClish 2009: 104; Olivelle, forthcoming b).

Looking at the work of the *ākarādhyakṣa*, we get a clear picture of what an *ākara* produced: gold, silver, copper, lead, tin,³ iron, Vaikṛta metal,⁴ and finally gems. These are

3. Rau (1974: 20), however, says that tin, although already known from the Vedic period, had to be imported, because there are hardly any deposits of tin within India.

4. The exact meaning of this term is unknown. Kangle, in his translation of the *Arthaśāstra*, guesses that it may be some sort of specialized iron. The term occurs with sufficient frequency in the *Arthaśāstra* (see 2.17.14; 4.1.35) within lists of metals for it to have been a well-known type of metal. Monier-Williams cites lexicons for the meaning of mercury, which is doubtful in this context.

precisely the kinds of ore that one would expect to come from a mine dug into the earth or a hill. The definition of *khani* given at *Arthaśāstra* 2.6.4 refers to similar products:

*suvarṇa-rajata-vajra-maṇi-muktā-pravāla-śaṅkha-loha-lavaṇa-bhūmi-prastara-rasa-dhātavaḥ
khaniḥ |*

Gold, silver, diamonds, gems, pearls, coral, conchs, metals, salt, and ores in the earth, rocks, and liquids—(these constitute) *khani*.

Here, however, we have, in addition to common products of mines, also substances coming from underneath the sea: pearls, coral, and conchs. It appears that *khani* indicated anything obtained from beneath the surface, whether it is the earth or water. So diving for pearls and corals constituted sea mining.

We get an interesting insight into the semantic development of *khani* within the *Arthaśāstra* in a one-sentence description of the *khanyadhyakṣa*, the superintendent of *khani*, at 2.12.27:

*khanyadhyakṣaḥ śaṅkha-vajra-maṇi-muktā-pravāla-kṣāra-karmāntān kārayet
paṇanavyavahāraṃ ca |*

The superintendent of *khani* should establish factories for conch shells, diamonds, gems, pearls, corals, and alkali, as well as the trade in them.

Here, one should note, the products of *khani* begin to be restricted to those mined from the sea. We still have diamonds and gems, which are not derived from the sea, and the somewhat unclear category of *kṣāra*, possibly sea salt as indicated by its mention in 2.6.4. Perhaps this official specialized in precious stones, under which may have been counted pearls and coral.

Another interesting piece of information is provided by a comment at *Arthaśāstra* 2.28.5–6:

*śaṅkha-muktā-grāhiṇo nauhātakaṃ dadyuḥ svanāvair vā tareyuḥ | adhyakṣaś caiṣāṃ
khanyadhyakṣeṇa vyākhyātaḥ |*

Conch and pearl fishermen should pay the boat-fee or travel in their own boats. What pertains to the superintendent of these, furthermore, has been explained under the superintendent of *khani*.

This back-reference may be to the single sentence on *khanyadhyakṣa* given above (2.12.21), but I very much doubt it. My suspicion is that it refers to a longer discussion of this superintendent, such as the one found under *ākarādhyakṣa* that occupies twenty-two *sūtras* of Chapter 12 of Book 2. This may indicate that at some point in the redactoral history of Book 2 (called the *adhyakṣapracāra*) of the *Arthaśāstra*, the term *ākara* came into prominence, and the semantic compass of *khani* became restricted, perhaps to diving for pearls and the like. However, this restriction is not observed in other parts of the Tantra section of the *Arthaśāstra*, where *khani* occurs with the normal meaning of pit mine. We have seen that at 2.6.4 metals are included in the definition of *khani*. Likewise, at 2.11.38 diamonds, at 2.12.36 metal ores, and at 2.22.10 metal merchandise (*dhātupaṇya*) are said to come from *khani*. So there is a possibility that the original title of 2.12 may have been *khanyadhyakṣa*.

This confusion of the semantics of the two terms is eliminated in the second half of the *Arthaśāstra*, where only *khani* occurs and where it has the normal meaning of mine. I give here two examples.

khanidhānyabhogayoḥ khanibhogaḥ kośakaraḥ, dhānyabhogaḥ kośakoṣṭhāgārarakaḥ.

Between the benefits from pit-mines and grain—the benefits from pit-mines create the treasury, while the benefits from grain create the treasury and the storehouse. (7.11.10)

*khanyor api yaḥ prabhūtasārām adurgamārgām alpavyayārambhām khaniṃ khānayaṭi, so
'tisamdhatte.*

Between two pit-mines, too, the man who sets up a pit-mine yielding a lot of valuable materials, with accessible roads, and needing little expenditure to operate is the one who outwits. (7.12.13)

The clear linguistic demarcation between the two parts of the text, along with other evidence, supports the view that they originated from different sources (Olivelle, forthcoming b). Evidently, the source(s) of the second half (*Āvāpa*) did not undergo revisions based on the new term *ākara* and maintained the old term *khani*.

Further light on the histories of these two terms may be shed by looking at other textual evidence. Unfortunately, however, our major source, the Vedas and the Vedic ritual *sūtras*, provides little or no information on mining. The terms *khani* and *ākara* in the sense of ‘mine’ are absent in the entire Vedic corpus, even though the term *khani* is used for a hole dug in the ground for ritual purposes.⁵

Pāṇini at 3.1.145, however, gives a useful hint when he provides a rule for the formation of an agent noun in the case of a craftsman (*śilpin*) by adding the suffix *aka*: *śilpini śyun*. Patañjali, commenting on this *sūtra*, lists three kinds of *śilpins*: actors, miners, and dyers: *ṛtikhanirañjibhyaḥ*. Thus we get from *khani* the term for miner: *khanaka*. This is the earliest attestation, besides the *Arthaśāstra*, I have been able to find for *khani*.

Yet, it is certain that *khani* is the older of the two terms for a mine. A brief look at R. L. Turner’s dictionary shows that derivatives from this term are found in Prakrit and in numerous modern Indian languages: Assamese *khani*, Hindi *khan*, Marathi *khaṇ* (fasc. 3, §3813). No modern Indian formation from *ākara* is recorded. There is, however, the Pāli equivalent *ākara* (fasc. 1, §1000), but only in compounds such as *ratnākara* and only in some late texts such as the Theragāthā and the Jātakas, which may have been influenced by the Classical Sanskrit usage of the term.

It appears, then, that at some point in time—probably after Patañjali (mid second century B.C.E.)—a new term came to be coined for a place with a rich deposit of metal ores or precious stones, and that term was *ākara*. I think it is reasonable to place this time around the first century B.C.E. It is unclear whether this resulted from a new method of mining or mining technology, using, for example, surface mining like a quarry rather than digging deep holes into the earth or into the sides of mountains. This a question that can only be answered by archeology, and perhaps this new linguistic data may spur archeologists to ask new questions of their data. The term *ākara* then came to dominate the usage eclipsing the older *khani*. I have, for example, found *ākara* used over forty times in the *Mahābhārata*, but never *khani* with the meaning of mine.⁶ The *Mahābhārata* often uses *ākara* with metaphorical meanings, such as *kusumākara* (6.32.35), *kamalākara* (3.155.52), and *amṛtasyākaraṃ param* (1.19.7). We see similar extended meanings of mine in English (“a mine of information”). On the other hand, *khani* is never used in these extended and metaphorical contexts. The *Rāmāyaṇa* uses *ākara* five times,⁷ but never *khani*. The *Kāmasūtra* uses *ākara* once (1.3.15), but not *khani*. The *dharmaśāstras* never use *khani* but only *ākara*.⁸

The dominance of *ākara*, as we saw, is reflected in the *Arthaśāstra* itself. The meaning of *khani* becomes restricted to under-water mining and gems. An interesting example of this specialized meaning, where *khani* becomes a sub-category of *ākara*, is found in the use of

5. See *Baudhāyana Śrautasūtra* 5.22.1 (10); *Āpastamba Śrautasūtra* 2.2.3.

6. The term is used at 2.59.8 as a verb to mean ‘dig up’, and at 14.4.7 in the name Khaninetra.

7. 1.34.12; 3.15.24; 4.15.17; 4.39.22, 29.

8. *Baudhāyana Dharmasūtra* 1.9.3; *Mānava Dharmasāstra* 7.62; 8.419; *Yājñavalkya Dharmasāstra* 3.242; *Vaiṣṇava Dharmasāstra* 3.16, 55; 23.48; 37.22.

the two terms in Varāhamihira's *Bṛhatsaṃhitā*. This text uses *ākara* a total of twelve times,⁹ but *khani* is found only once (80.10), in the following verse that deals with the sources of diamonds:

srotāḥ khaniḥ prakīrṇakam ity ākarasambhavas trividhaḥ.

What [i.e., diamonds] originates from *ākaras* is threefold: river, mine, and miscellaneous.¹⁰

So here we have *khani* as one kind of *ākara*, which appears now to be extended to mean any source of gems and possibly of other minerals. This passage parallels a statement of the *Arthaśāstra* (2.11.38): *khaniḥ srotāḥ prakīrṇakam ca yonayaḥ* “mine, river, and miscellaneous are the sources (of diamonds).” That *ākara* has taken the meaning of source or place of origin rather than mine in the *Bṛhatsaṃhitā* is indicated by 81.2, where after listing *Siṃhalaka*, *Paraloka*, *Surāṣṭra*, and others, the verse concludes that these are the eight *ākaras* of pearls. So places such as Sri Lanka are now referred to as *ākaras*, and in the very next verse reference is made to *siṃhalākara* pearls, where also *ākara* means ‘origin’.

Beyond this interesting linguistic bifurcation, the *Arthaśāstra* also provides the most detailed account of the operation of mines, as well as methods to locate them and to identify ore-bearing rocks and earth, from ancient India. Given our limited knowledge of ancient mining technology, we can only guess at the meaning of some of Kauṭilya's statements. But this description should be—no pun intended—a gold mine of information for archeologists.

It is the responsibility of the superintendent of mines to identify likely locations of mineral deposits, to start new mining operations, and to refurbish and make operational abandoned mines:

The superintendent of mines—who is either proficient in geometry,¹¹ metallurgy, smelting, and coloring gems or assisted by one so proficient, and who is provided with workers skilled at such tasks along with suitable equipment—should inspect abandoned mines revealed by dross, crucibles, coal, and ashes, or new mines with ore-bearing earth, rocks, or liquids that have a strong color, exceptional weight, and acrid smell and taste. (*Arthaśāstra* 2.12.1)

Kauṭilya goes on to provide information about the characteristics of liquids, rocks, and earth that contain metal:

Gold-bearing liquids¹² are those that flow in the interior of hollows, caves, valleys, rock-cuts, or covert excavations on mountains in recognized regions; liquids that have the color of rose-apple, mango, palmyra nut, slice of ripe turmeric, jaggery, orpiment, red arsenic, honey, vermilion, white lotus, or feathers of a parrot or peacock; that have water and plants of the same color in the vicinity; and that are viscous, limpid, and heavy. If they spread like oil when thrown in

9. *Bṛhatsaṃhitā* 14.12; 16.14, 26; 19.6, 10, 17; 47.24; 79.10; 80.2, 3; 103.12, 61.

10. It is unclear whether here, and in the parallel passage of the *Arthaśāstra*, the term *prakīrṇakam* simply means ‘miscellaneous’ or has a more technical meaning referring to a particular kind of mineral or gem deposit.

11. The term *śulba* occurs here and in the context of the superintendent of agriculture (2.24.1). The meaning of the term in these two contexts is unclear. Given the work that these two officials have to undertake, it must refer both to the measuring and surveying of the land and to evaluations of land suitable for various kind of agriculture and mining activities. In the context of mines, it may have the meaning of detecting hidden deposits of ores; we have an enumeration of such signs at 2.12.2–7. Kangle (1972: 182) translates the term as ‘geology’, and the term probably encompasses some aspects of geology.

12. The solubility of gold in certain kinds of liquids has been scientifically established: see R. W. Henley, “Solubility of Gold in Hydrothermal Chloride Solutions,” *Chemical Geology* 11 (1973): 73–87; I. Y. Nekrasov, *Geochemistry, Mineralogy and Genesis of Gold Deposits* (Rotterdam: Balkema, 1996), 131f.

water and soak up mud and dirt, they are capable of infusing copper and silver over a hundred-fold.¹³ What is similar to them but with an acrid smell and taste should be identified as bitumen.

Ores from earth and rocks that have a yellow, copper, or coppery-yellow color; that contain blue streaks or have the color of Mudga bean, Māṣa bean, or Kṛsara porridge when they are split; that are speckled as if with drops or globs of curd; that have the color of turmeric, myrobalan, a lotus leaf, moss, liver, spleen, or saffron;¹⁴ that contain lines, dots, or svastikas of fine sand when they are split; that have nodules and are lustrous; and that do not split but do produce a lot of foam and smoke when they are heated—they are the ones that are gold ore. When used as an admixture, they are capable of infusing copper and silver.¹⁵

Those that have the color of conch, camphor, crystal, fresh butter, a dove, a pigeon, a Vimalaka gem, or a peacock's neck; or the color of Sasyaka gem, Gomedaka gem,¹⁶ jaggery, or raw sugar; or the color of the flowers of Kovidāra, lotus, Pāṭali, Kalāya, flax, or linseed; those that contain lead or antimony; that smell like raw flesh; that are black with a white sheen, white with a black sheen, or all speckled with lines or dots; that are soft and, when smelted, do not split but produce a lot of foam and smoke—they are the ones that are silver ores.

In the case of all ores, as their weight increases so does their metal content. (*Arthaśāstra* 2.12.2–7)

Although, without a better grasp of ancient Indian metallurgy, it is difficult to fully understand the above passage, this is probably the most detailed account of metal geology that we have from ancient India. The text goes on to note the characteristics of rocks and earth that contain base metals and gems:

When ore from rocks or an area of earth is heavy, oily, and soft—it is copper ore if it is yellow, green, pale red, or blood red; it is lead ore if it is black like a crow, or has the color of a pigeon or yellow bile, or is studded with white lines, and smells like raw flesh; it is tin ore if it

13. The significance of *veddhṛ* (meaning something like 'infuse'), a term found only here in the *Arthaśāstra*, is obscure. I think the term may refer to a process where this liquid is used in the smelting of copper and silver ore. We have a similar statement at the end of 2.12.5 with the term *vedhana*. Shamasastri translates as "amalgamate themselves more than cent per cent with copper or silver." Kangle (1965: 71–72) dismisses the idea that this *rasa* in the *AŚ* refers to some kind of alchemy. Scharfe (1993: 275), however, supports Jolly's theory that the term *veddhṛ* in its current meaning is derived from Greek chemistry and alchemy. I do not think that as practical a text as this will be dealing with alchemy; and we do not find the mention of mercury anywhere in the text. The idea here appears to be the boiling of copper and silver with a liquid containing gold in solution. This process deposits gold ions on the surface of the other inferior metal, making it take on the appearance of gold. This is the kind of gold alloy that is referred to as *rasavidha* at 2.13.3, where all the other terms also refer to sources of gold.

14. The term *anavadya* (lit., 'faultless') is problematic. Wojtilla (2009: 40) has taken issue with Kangle's rendering "colour of saffron," pointing out that rubies are not saffron-colored, meaning yellow. There are two other passages that use the compound *anavadyavarna*. At 2.11.51 it refers to the color of sandalwood (the other color mentioned being red-black), and at 2.12.5 it refers to gold-bearing ores, and the two other colors mentioned alongside this are the color of a liver or spleen. It is difficult to see in these contexts what a "faultless color" may mean. In both contexts, the color is something close to red. The problem raised by Wojtilla can be solved if we take the color to be that of saffron stamens, which are the ones used in flavoring, rather than the flower or the yellow color normally referred to as saffron. The stigmas of the saffron crocus (*Crocus sativus*) are dark red in color, and taking the color as related to a flower also fits the context where numerous flowers are mentioned.

15. The term *prativāpa* ('admixture') indicates a chemical that is added to the smelting or boiling of something. This addition creates a coating, just as in 2.12.3. See the use of this term at 2.12.8, 11; 2.25.22; 14.2.6. It appears that here gold-bearing ore is heated with solid pieces of copper or silver. The gold is deposited on the surface of the other metal, creating a coating of gold similar to the one described above in note 13. I want to thank Gyula Wojtilla for his insights into these metallurgical processes. Much, however, remains obscure.

16. For these varieties of gems, see *Arthaśāstra* 2.11.30 and 35. The last, Gomedhaka, appears to be a type of beryl that has the color of cow's fat.

is variegated like saline soil or has the color of baked clay; it is iron ore if it is orange,¹⁷ pale red, or the color of Sinduvāra flower; it is Vaikṛntaka¹⁸ ore if it is colored like a Kākāṇḍa¹⁹ or a birch leaf; it is gem²⁰ ore if it is clear, smooth, gleaming, sonorous, cool, and with a very intense color. (*Arthaśāstra* 2.12.12–17)

Mines and mining were probably state monopolies in ancient India. Yet, the private sector may have had a hand in mining. Kauṭilya advises the king to lease mines that are difficult to work or that require a lot of initial capital:

When a mine becomes too onerous because of the expenses or effort required, he should lease it for a share of the proceeds or rent it out; he should operate by himself ones that are easy to manage. (*Arthaśāstra* 2.12.22)

Let me, in conclusion, turn briefly to the issue of dating texts, for which I think the use of these two terms for mines may provide valuable clues. With reference to the *Arthaśāstra* itself, I think that Kauṭilya could not have introduced the changes that resulted in the prominence given to *ākara* in the first part of the treatise. If he had introduced this change, it is difficult to explain why he did not use the term also in the second half. The likely scenario is that at some point in the history of the first half, especially Chapter 2, the *adhyakṣapracāra*, which probably existed as an independent treatise before its incorporation into Kauṭilya's text (Trautmann 1971; Olivelle, forthcoming b), *ākara* may have come into prominence within the mining industry and the term was inserted into this text. Kauṭilya simply incorporated the *adhyakṣapracāra* into his treatise and, along with it, the new term *ākara*. This linguistic updating was not carried out by the authors of the sources that Kauṭilya used for the second half of his treatise. I have argued (Olivelle, forthcoming b) for assigning the Kauṭilya recension to mid to late 1st century C.E. and his sources to early first century C.E. or first century B.C.E. This also supports the first century B.C.E. as the likely period for coining the term *ākara* for mine.

I have shown elsewhere (Olivelle, forthcoming a) that the term *dvija* was a late introduction into the theological vocabulary of Brahmanism, probably in the first century B.C.E. at the earliest. I have argued that its presence in the two Sanskrit epics and in texts such as the *Mānava-Dharmaśāstra* indicates a date in or after the first B.C.E. for these texts. The presence of *ākara* in these same texts, along with the absence of *khani*, point, I think, in a similar direction. So, the recent dating of the epics to the first century B.C.E. or after looks like an attractive hypothesis also in the context of the semantic histories of *dvija*, *khani*, and *ākara*. These linguistic markers, I think, can help us in the dating of other ancient Indian texts within narrower limits than has been possible thus far.

17. The meaning of the term *khurumba* ('orange') is obscure. Kangle, following the commentators, takes it to mean ore consisting of smooth stones. I take it as a color because it is color that predominates in these descriptions. Variant spellings of this word include *kurumba*, which may connect it to *kuruba*, *kurabaka*, indicating a red-colored flower (Barleria or amaranth).

18. See note 4.

19. *Kākāṇḍa*: literally means 'crow's egg', but it is the tree *Diospyros tomentosa* (Macri 1988: 33) and identified as *mahānimba* in the *Śabdakalpadrūma*.

20. The term *maṇi* generally means a gem or a precious stone. Coming as it does at the end of a list of metal ores, it is certainly out of place. The term, however, does not occur anywhere else as a particular metal, even though Tokunaga (2005: 5) appears to indicate that it is the name of a metal.

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