Body and Cosmos

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Plagues and Brahmins: Did a Combination of Epidemics and Ideology Empty India's Cities?

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The *Economist* of July 19th 2014 points out (p. 47) that in India "[t]oday, out of every 100 children, 1.7 more Muslim than Hindu ones survive to five years, a big gap."* The difference, it adds, has much to do with toilet habits: "Hindu tradition, seen for example in the 'Laws of Manu', a Hindu text some 2,000 years old, encourages defecation in the open, far from home, to avoid ritual impurity."[1] As a result, "India fares worse on sanitation than a host of poorer places including Afghanistan, Burundi and Congo." Resistance in India against toilet use continues today, in spite of pressure from above, evoking the comment that "[i]t is easier to build a toilet than to get people to use it" (*Economist* of August 19th 2017, p. 40). The same newspaper refers to the effects of widespread diarrhea in its issue of March 24th 2018 (p. 11): "One reason Indian children are shorter than sub-Saharan African children from families of similar means is that they fall sick more often."[2]

Brahmanical ideology, this example suggests, had (and has) effects "on the ground." These effects went beyond mere toilet habits. This paper will first concentrate on the effects Brahmanism had on issues as important as urbanization and economics.

* Thanks are due to Gregory Schopen, Harry Falk, Andrey Klebanov, Claire Maes, and Veena Mushrif-Tripathy for their advice, and to Ernst Prets for drawing my attention to the thesis of Angermeier.

1 The Laws of Manu (*Mānavadharmaśāstra*) does not appear to contain a rule of this nature, but other texts on Dharma do; see Pandurang Vaman Kane, *History of Dharmaśāstra*, second edition (Poona: Bhandarkar Oriental Research Institute, 1968–1977), vol. II.1, 649 ("One should answer calls of nature away from a human habitation towards the south or south-west"). Note, however, Klaus Karttunen, "Ancient Traditions and Modern Challenges: South Asian Studies Today," *Politeja* 1, no. 40 (2016), 14: "In the first half of the 20th century it was still common to explain social relations in modern South Asia with theoretical quotations from the works such as the *Mānavadharmaśāstra*. Now, of course, such an attempt would no longer pass as scholarship."

2 For details about toilet use in modern India and its consequences, see Diane Coffey and Dean Spears, *Where India Goes: Abandoned Toilets, Stunted Development and the costs of Caste* (Noidi: HarperCollins India, 2017).

Brahmanism did not like urban life.[3] The *Baudhāyanadharmasūtra* states:[4] "'A man who keeps himself well under control will attain final bliss even if he lives in a city with his body covered with the city dust and his eyes and face coated with it'—now that is something impossible." The *Āpastambadharmasūtra* prescribes, similarly:[5] "He should also avoid visiting cities." The *Gautamadharmasūtra* points out that, "according to some, Vedic recitation is always suspended in a town."[6] A pericope that occurs a few times in the *Saṃnyāsopaniṣad*s states:[7] "He shall avoid [...] capital cities as he would the Kumbhīpāka hell."

These few quotations come from early texts[8] that actually mention cities. Many more adopt a different strategy altogether: they do not mention them; they do as if there are no towns and cities.[9] Where possible, they depict themselves in a world that is no longer there.[10] In this respect (and to avoid misunderstanding, let me add: only in this respect), their behavior is not dissimilar to that of another group that was obsessed with the past: the National-Socialists of the

3 See, in general, Johannes Bronkhorst, *Greater Magadha: Studies in the Culture of Early India* (Leiden and Boston: Brill, 2007), § 111.5.

4 BaudhDhS 2.6.33; ed. trans. Patrick Olivelle, *Dharmasūtras: The Law Codes of Āpastamba, Gautama, Baudhāyana, and Vasiṣṭha* (Delhi: Motilal Banarsidass, 2000), 264–265.

5 ĀpDhS 1.32.21; ed. trans. Olivelle, *Dharmasūtras*, 72–73.

6 GautDhS 16.45. Similarly VasDhS 13.8–11.

7 *Nāradaparivrājakopaniṣad*, ch. 7, ed. Dikshitar, 116, ed. Schrader, 199–200; *Bṛhat-saṃnyāsa Upaniṣad*, ed. Schrader (Madras: The Adyar Library, 1912), 268: *tyajet* [...] *rājadhānīṃ kumbhīpākam iva*; trans. Patrick Olivelle, *Saṃnyāsa Upaniṣads: Hindu Scriptures on Asceticism and Renunciation* (New York and Oxford: Oxford University Press, 1992), 214, 253–254. These Upaniṣads know different terms for towns of various sizes, such as *pattana*, *pura* and *nagara*; see *Nāradaparivrājakopaniṣad*, ed. Dikshitar, 81, ed. Schrader, 159: "A mendicant may spend one night in a village, two in a burg, three in a town, and five in a city," trans. Olivelle, *Saṃnyāsa Upaniṣads*, 187.

8 The above-mentioned texts are actually a lot younger than has often been supposed; see Patrick Olivelle, "Patañjali and the Beginnings of Dharmaśāstra: An Alternate Social History of Early Dharmasūtra Production," in *Aux abords de la clairière: Études indiennes et comparées en l'honneur de Charles Malamoud*, eds. Silvia D'Intino and Caterina Guenzi (Turnhout: Brepols, 2012); Johannes Bronkhorst, *How the Brahmins Won: From Alexander to the Guptas* (Leiden and Boston: Brill, 2016), § 1.2. The same can be said of much of middle- and late-Vedic literature; see Bronkhorst, *Greater Magadha*, 175–262 ("Part III: Chronology").

9 Bronkhorst, *Greater Magadha*, 251 f.

10 For this reason, Brahmanical ideology may be better characterized as 'reactionary' (as used, e.g., in Mark Lilla, *The Shipwrecked Mind: On Political Reaction* (New York Review Books, 2016)) than as 'conservative'.

Third Reich. In the House of German Art in Munich, opened by Hitler in 1937, there were hundreds of paintings; not one depicted urban and industrial life.[11] This in spite of the fact that already by 1910, "Germany had almost as many large cities as the rest of Europe put together."[12]

Brahmanical literature of the period concerned, then, presents an image of an ideal world that no longer existed (even if we assume that it ever existed). The presentation of this imaginary world was not only meant to preserve the memory of an idealized past; its other, equally important, purpose was to shape the future in accordance with Brahmanical wishes. It is in this period of transition that a new notion pops up in Brahmanical literature, that of the Brahmanical hermitage (*āśrama*). Brahmins are depicted as living in these simple yet idyllic places, dedicating themselves to their Vedic ritual duties, reciting mantras in the process. These hermitages appear in the literature right at the time when also gifts of land to Brahmins—the so-called *agrahāra*s—begin to appear in literature and in the epigraphic record. It only makes sense to connect the two institutions: The literary *āśrama*s functioned as encouragement for rulers and others close to the centers of political power to provide Brahmins with *agrahāra*s, an encouragement that became extraordinarily successful in subsequent centuries. As was to be expected, Brahmanical literature never suggests that *āśrama*s were an innovation. Quite the contrary, literature presents us with the idea that *āśrama*s had always been there. This illustrates the fact that Brahmanism, even where it innovates, never admits that it does so. Brahmanism projects the image of preserving the past, even in cases where historical scholarship can show that it doesn't.

Brahmanism made a concerted effort to project a certain image of Brahmins and the world they live in. This world was partly based on an idealized memory of the past; partly it represented the present interests of those Brahmins. The ideal Brahmin had no truck with the corruptions of modern life, such as city dwelling, the use of debased dialects (i.e., of languages other than Sanskrit), and much else. Instead he lived (or presented himself as living, or as wishing to live) in a pure and idyllic *āśrama*, he used Sanskrit, i.e. the original and pure language, and he did not use modern inventions such as writing.

11 Peter Watson, *A Terrible Beauty: The People and Ideas That Shaped the Modern Mind: A History* (London: Phoenix, 2004), 311–312.

12 Peter Watson, *The German Genius: Europe's Third Renaissance, the Second Scientific Revolution, and the Twentieth Century* (London: Simon & Schuster, 2010), 437.

The Brahmanical dislike for urban life had profound consequences, at least according to certain scholars. According to Giovanni Verardi:[13]

> From the 3rd century onwards, the crisis of the trade economy became increasingly profound. The decline of the Indian cities began, which caused the de-urbanization of the country already in Gupta times (…). This was the moment in which the Brahmanic social and economic model, based on land, regained [I would prefer *gained*, JB] the upper hand. I would like to underline, in this regard, that I do not believe that the new social order that India was preparing depended on the general, changed state of the economic fundamentals (the rise of Islam demonstrates that the conditions of economic stalemate could be successfully overcome by relying on trade, to the point of transforming a very large number of regions very different from each other into a great urban and mercantile civilization). On the contrary, I think that Brahmanic ideology, which had always been hostile to anything that questioned the social equilibrium attained in the rural areas, exerted a fundamental function in determining the decline of the urban and mercantile economy of the subcontinent, the struggle against which coincided basically with the struggle against the Buddhists and Jains. The 'Brahmanic model' did not prevail because of objective and uncontrollable factors; on the contrary, it was actively pursued and constructed.

I think that Verardi is right, that Brahmanical ideology was one of the factors behind the urban decline from Gupta times onward.

Having said this, it is only fair to point out that not all Brahmins shunned cities. The most ardent adherents of the Vedic sacrificial tradition no doubt lived in the countryside, far from the cities. However, not all Brahmins did so. From around 500 BCE onward, kings began to rule their kingdoms from courts and capitals, and these courts and capitals attracted Brahmins, i.e., certain Brahmins, as well as others.

Consider the following passage from the *Mahābhārata* (12.77.2–4):

> Those men who manifest perfectly the marks of learning, who look to the Vedic texts on every matter, are the equivalent of Brahmā, [oh] king, and they are celebrated as 'Brahmins'. Those who are perfectly accom-

13 Giovanni Verardi, "Religions, Rituals, and the Heaviness of Indian History," *Annali* (*Istituto Universitario Orientale, Napoli*) 56 (1996): 239.

> plished as ritual priests or teachers and carry out their proper works are the equivalent of the Gods among Brahmins. Those who serve as priests, court priests (*purohita*), advisors (*mantrin*), ambassadors (*dūta*), or finance managers, [oh] king, are the equivalent among Brahmins of Kṣatriyas.
>
> trans. FITZGERALD

This passage shows that there were Brahmins who sold their services as priests, court priests, advisors, ambassadors, or finance managers. It also shows that these Brahmins were ranked lower than those who concentrated on Vedic learning. Indeed, a few verses later the text specifies that, in case of need, a king can take taxes from Brahmins, with the exceptions of those who are the equivalent of Brahmā or the Gods (v. 9), i.e., with the exception of those who concentrate on Vedic learning. The Brahmins of the cities, as is clear from this passage and many others, aspired to various positions, such as that of *purohita* or councilor to the king. These were the Brahmins who wrote, and read, the *Arthaśāstra*, the *Kāmasūtra*, the courtly literature which has been preserved, and no doubt much besides. Information about these urban Brahmins, and about the privileges they felt entitled too, can be obtained from the *Arthaśāstra*.[14] Kangle sums it up in the following words:[15]

> [S]pecial privileges are intended for [the Brahmin], particularly for a Śrotriya, that is, a Brahmin learned in the Vedas. It is recommended, for example, that land free from taxes and fines should be granted to a Śrotriya, just as such lands are to be granted to the priests and preceptors of the ruler (2.1.7). It is also laid down that the property of a Śrotriya, even when he dies without an heir, cannot escheat to the state like the property of other citizens (3.5.28). Brahmins in general are, it seems, to be exempted from payment at ferries and pickets (3.20.14). In many cases, punishment for offences is made dependent on the varṇa of the offender. In cases of abuse, defamation, assault etc., an ascending scale of fines is prescribed in accordance with the offender's varṇa (Chapters 3.18 and 3.19). [...] Discrimination on the basis of varṇa is referred to in connection with the oath to be administered to witnesses (3.11.34–37), in the matter

14 For the date and composition of the *Arthaśāstra*, see Patrick Olivelle, *King, Governance, and Law in Ancient India: Kauṭilya's Arthaśāstra* (Oxford: Oxford University Press, 2013), 25 ff.

15 R.P. Kangle, *The Kauṭilīya Arthaśāstra. Part III: A Study*, first edition (Bombay: Bombay University, 1965; reprint, Delhi: Motilal Banarsidass, 1986), 144 f.

> of inheritance by sons born of wives belonging to different varṇas (3.6.17–20) and so on. Again, the varṇas are to occupy different residential areas in the city, the Brahmins in the north, the Kṣatriyas in the east and so on (2.4.9–15). It is also laid down that in social matters seniority shall be fixed from the Brahmin downwards. And the Brahmin is declared to be free to refuse contributions to common festivals and yet entitled to take full part in them (3.10.43–44). There can be no doubt about the high status enjoyed by the Brahmin as such, or about the privileges and concessions reserved for him.

It is more than likely that the *Arthaśāstra* paints far too attractive a picture of the privileges of the Brahmins, but this is undoubtedly due to the fact that Brahmins were involved in trying to influence public life at and around the royal court; they had to convince the king that it was his task to install and maintain "the law laid down in the Vedic lore which is beneficial, as it prescribes the respective duties of the four *varṇa*s and the four *āśrama*s."[16] They may or may not have obtained all the privileges they wanted, but what is important for us is that they were there, at the courts and in the cities. These were urban Brahmins, and we may be well advised not to confuse them with those other Brahmins who stayed as far as possible from urban centers, in the countryside where they stuck to their Vedic traditions.

Consider next the *Kāmasūtra* of Vātsyāyana. This is clearly a Brahmanical text, which traces its ancestry to the Brahmanical god Prajāpati and the Upaniṣadic seer Auddālaki Śvetaketu (1.1.5–9).[17] It grants certain privileges to Brahmins who know the Veda (*śrotriya*), such as its rule that the wife of such a Brahmin cannot be taken as lover by someone else.[18] Successful courtesans are presented as offering thousands of cows to Brahmins.[19] One of its chapters is called *Catuḥṣaṣṭi* "sixty-four;" the *Kāmasūtra* points out that some see a link with the *Ṛgveda* here: the *Ṛgveda*, too, is called *Catuḥṣaṣṭi*.[20] It is yet

16 *Arthaśāstra* 1.3.4; trans. R.P. Kangle, *The Kauṭilīya Arthaśāstra*, Part II, second edition (Bombay University, 1972; reprint: Motilal Banarsidass, Delhi, 1988), 7, modified.

17 According to the *Mahābhārata* (Mhbh 1.113), Śvetaketu, the son of Uddālaka, laid down the rule that "a woman's faithlessness to her husband shall be a sin equal to aborticide" (trans. van Buitenen), thus changing the earlier habit of faithlessness. According to Mhbh 12.35.22cd, Uddālaka had Śvetaketu fathered by one of his pupils.

18 Vātsyāyana, *Kāmasūtra* 1.5.29–31.

19 Vātsyāyana, *Kāmasūtra* 6.5.28. See further H.C. Chakladar, *Social Life in Ancient India: A study in Vatsyayana's Kamasutra*, second revised edition (Calcutta: Susil Gupta, 1954), 75 f.

20 Vātsyāyana, *Kāmasūtra* 2.2.3.

also a text which deals with urban dwellers: the man-about-town (*nāgaraka*; trans. Doniger and Kakar) plays a central role (and provokes the envy of village dwellers[21]).

It seems clear that there were Brahmins both inside and outside the cities. Ideally Brahmins lived outside the cities and disapproved of them. This disapproval, it is here proposed, is one of the factors, perhaps the most important factor, behind the decline in city life that we observe from the time of the Guptas onward.

Not all scholars agree with this. Consider the following passage from Cédric Ferrier's book *L'Inde des Gupta*:[22]

> Grâce à l'amélioration de l'agriculture, capable de dégager des surplus pour nourrir une population non rurale, et grâce à l'expansion du commerce, les villes de l'empire gupta se sont développées. La géographie urbaine de cette époque est en grande partie l'héritage des périodes précédentes. À partir des IIIe et IVe siècles, on constate cependant une certaine désurbanisation en Inde du Nord, résultant d'une contraction du commerce à longue distance mais aussi de la défaillance des pouvoirs politiques. La recherche historique récente a également mis l'accent sur le rôle du milieu naturel. Au cours de la période, la croissance démographique aurait été en partie absorbée par les villes mais cela aurait entraîné, dans certains cas, un déséquilibre entre la population et les ressources. La pression sur les champs, la déforestation relative et le surpâturage paraissent avoir déstabilisé les milieux fragiles, causant inondations et sécheresses. La population urbaine aurait été contrainte de se redéployer dans les campagnes, la mise en valeur agricole étant favorisée par le biais des cessions de terres.
>
> La géographie urbaine sous les Gupta présente en fait des situations très contrastées. Dans la haute vallée du Gange, le déclin urbain paraît fort, sans doute dû aux troubles politiques dans le Nord-Ouest. Des villes comme Śrāvastī et Kanauj sont manifestement en pleine déshérence. Mathurā, peut-être intégrée dans l'empire sous Samudragupta, voit son influence fortement diminuée. Dans la vallée moyenne, le déclin reste

21 See Vātsyāyana, *Kāmasūtra* 1.4.36: "A man who lives in a village stirs up his clever and curious relatives, describing to them the lifestyle of the set of men-about-town and inspiring their longing for that life. He emulates it himself." (trans. Wendy Doniger and Sudhir Kakar, *Vatsyayana Mallanaga Kamasutra* (Oxford: Oxford University Press, 2002), 21).

22 Cédric Ferrier, *L'Inde des Gupta* (*IVe–VIe siècle*) (Paris: Les Belles Lettres, 2015), 153–154.

> marqué, comme le montre le cas de Vaiśālī. La situation est similare à Gayā et à Rājagṛha. Cette région subirait, mais dans une moindre mesure, les conséquences des changements économiques évoquées précédemment. Parallèlement, certaines villes croissent comme celles de la basse vallée du Gange.

In other words, economic difficulties led to the decline in city life. The question how the Gupta Empire, despite major economic difficulties, could establish itself and expand, is answered by Fred Virkus in the following words:[23]

> Dies würde bedeuten, dass ein geographischer Bereich, der von einer ökonomischen und, wie Thakur meint, auch ökologischen Krise heimgesucht wurde, politisch für etwa zwei Jahrhunderte eine dominierende Rolle spielen konnte. Dabei wäre allerdings auch in Betracht zu ziehen, dass möglicherweise gerade durch verschärften Ressourcenmangel, Bondeknappheit und ein allgemeines Absinken des materiellen Enwicklungs- und Lebensniveaus in Nordindien ein starker Expansionsdrang hervorgerufen wurde.

As indicated above, the claim to be considered in this article is that economic factors were not the only ones behind the urban decline in the first half of the first millennium CE. Ideological factors, most notably the predominance of Brahmanical ideology, played a role, too.

How could one possibly prove such a claim?

I think that an article by Harry Falk that came out in 2006 and is called "The Tidal Waves of Indian History: Between the Empires and Beyond" comes as close to a proof as one might reasonably hope. In this article Falk draws attention to an alternating succession of extroverted and introverted phases in Indian history from the Mauryas to the Guptas. In brief:[24]

> the Mauryas made use of the Hellenistic brain drain; the succeeding Śuṅga Dynasty and its successors shunned intense foreign contacts; instead, traditional grammar and ritual were revived.
>
> The succeeding foreign rulers of Śaka, Pahlava, and Kushana stock neglected the indigenous way of life and built centers of learning, e.g.,

23 Fred Virkus, *Politische Strukturen im Guptareich* (Wiesbaden: Harrassowitz, 2004), 27.

24 Harry Falk, "The Tidal Waves of Indian History: Between the Empires and Beyond," In *Between the Empires: Society in India 300 BCE to 400 CE*, ed. Patrick Olivelle (Oxford: Oxford University Press, 2006), 146.

> at Ujjain, and made a living through intensive trade relations with East and West. The succeeding Gupta Dynasty reverted to indigenous values, to sciences of the word; inspiration from foreign sources began to come to a close.

The same alternation finds expression in the currency. To quote Falk:[25]

> The oscillating model is obvious: the foreign or foreign-inspired dynasties aim at a high-value currency of precious metals, whereas the first indigenous dynasties, the Śuṅgas and their contemporaries, tend to neglect the issue, and the second indigenous wave, the Guptas and their affiliates, soon lose their way economically.
>
> The attitude toward large-scale enterprise apparent in this scheme reminds us of the traditional archenemies, i.e., the Paṇis in the Ṛgveda or the Asuras in the Upaniṣads: the Paṇis are the rich merchants, as are the Asuras. The people responsible for the Vedas and Upaniṣads maintained ideals of a very different nature: having a thousand cows was treasured, but making riches through trade and barter was disdained. Acquiring riches as *dakṣiṇā* at a sacrifice was accepted, but organizing production units involving possibly impure cooperators was not the core interest of those defining what Vedic *dharma* is and what is not.

Other scholars, too, have noticed the economic consequences of the "closing down of the open society," i.e., the predominance of Brahmanism. Giovanni Verardi puts it as follows:[26]

> There is little doubt that the closing down of the open society of the Buddhists and the resulting weakening of the religion of Dharma coincides with the fall in international trading activities, and in particular with the much decreased demand for Indian goods from Rome. Kuṣāṇa currency, circulating over a vast territory, had been linked to the Roman currency system. The collapse of the Han dynasty in China (AD 221) contributed to changing the picture in Central Asia. By that time, we observe a change in the Indian landscape, namely, a rapid process of deurbanization. It is every archaeologist's experience that even in the case of continuous human occupation, post-Kuṣāṇa levels display much poorer

25 Falk, "Tidal Waves," 154.

26 Giovanni Verardi, *Hardships and Downfall of Buddhism in India* (Singapore: Institute of Southeast Asian Studies / India: Manohar, 2011), 106.

> building techniques and reuse of earlier building material. A great number of small and large towns were abandoned in the third century, and in certain areas, as is shown by territorial surveys, the collapse of a whole network of roads and small settlements, which had been kept functioning by Buddhist monasteries, is observable.

In other words, Brahmanism, when and where it was accepted, could and did exert an influence on economic life. It was in this way one of the factors, perhaps the most important one, responsible for the urban decline from Gupta times onward.

Along with this, another contributing factor must be considered: in pre-modern days, cities were places where diseases flourished, they were "population sinks."[27] To cite McNeill:[28]

> Until very recently cities were unable to maintain their numbers without a substantial inflow of migrants from surrounding countrysides. Urban health hazards were simply too great, for, in addition to infectious person-to-person diseases transmitted as childhood diseases usually are—by breathing in droplets of infectious matter sneezed or coughed into the atmosphere—ancient cities suffered from an intensified circulation of diseases transmitted through contaminated water supplies, plus a full array of insect-borne infections. Any breakdown of transportation bringing food from afar threatened famine, and local crop failures were often difficult to compensate for. In view of all this it is not surprising that cities could not maintain themselves demographically, but had to depend on migrants from the countryside to replenish the losses arising from famine, epidemic, and endemic diseases.

What this implies is that without sufficient encouragement for country dwellers to move to the cities, or with active discouragement to do so, cities would dwindle all by themselves. Brahmanical ideology may—indirectly, through royal policies—have reduced the attraction of moving into the cities of northern India, for example by changing the conditions in which typically urban activities, such as commerce, could be carried out.

There is a further way in which diseases may have played a role in India's urban decline, presumably once again in tandem with the growing Brahmani-

27 David P. Clark, *Germs, Genes, and Civilization: How Epidemics Shaped Who We Are Today* (Upper Saddle River, New Jersey: FT Press, 2010), 213.

28 William H. McNeill, *Plagues and Peoples* (New York: Anchor Books, 1977), 80.

cal cultural influence: through epidemics.[29] Epidemics are to a large extent an urban phenomenon: "You cannot have an epidemic without a large, vulnerable population to infect: that's what makes it an urban disease."[30]

We know that epidemics have had profound effects elsewhere in the world, to the point of bringing down empires and destroying economies. It has even been argued that infections may have contributed to the collapse of the Indus Valley culture: cholera or a closely related waterborne infection according to some,[31] plague outbreaks according to others.[32] And perhaps the Greeks in Alexander's army turned back from northwestern India because they may have been suffering from malaria and dysentery.[33] Richard Gombrich wonders whether infectious diseases may have been a contributing cause to the early Buddhist conviction that life is suffering.[34]

We have seen above that India before the Guptas had gone through a period of relative openness toward the outside world, with many and frequent commercial contacts. With this in mind, we may look at the following passage from McNeill's classic *Plagues and Peoples*, 124:

> We may infer that by about the beginning of the Christian era, at least four divergent civilized disease pools had come into existence [in Eurasia], each sustaining infections that could be lethal if let loose among

29 The observations at the beginning of this article may have some relevance here. The custom of pilgrimage may have made India particularly vulnerable, as the colonial authorities around 1900 CE realized by banning Muslim pilgrimage to the Holy Lands (Sandhya L. Polu, *Infectious Disease in India, 1892–1940: Policy-Making and the Perception of Risk* (London: Palgrave Macmillan, 2012), 31ff.); on pilgrimage in Hinduism, see Knut Jacobsen, *Pilgrimage in the Hindu Tradition: Salvific space* (New York: Routledge, 2012).

30 Brenna Hassett, *Built on Bones: 15,000 Years of Urban Life and Death* (London: Bloomsbury Sigma, 2017), 211. Cf. Jared Diamond, *Guns, Germs, and Steel* (London: Jonathan Cape, 1997), 205f.

31 Clark, *Germs, Genes, and Civilization*, 71ff.

32 Tony Joseph, *Early Indians: The Story of Our Ancestors and Where We Come From* (New Delhi: Juggernaut, 2018), 159–160, with a reference to Simon Rasmussen et al., "Early Divergent Strains of Yersinia Pestis in Eurasia 5,000 Years Ago," *Cell* 163, no. 3 (2015). Rita P. Wright, *The Ancient Indus: Urbanism, Economy, and Society* (Cambridge: Cambridge University Press, 2010) does not include epidemics among the list of causes that may have contributed to the decline of the Indus civilization. J.R. McNeill and William H. McNeill, *The Human Web: A Bird's-Eye View of World History* (New York and London: W.W. Norton, 2003), 62, suggest that the onset of malaria may have played a role.

33 R.S. Bray, *Armies of Pestilence: The Effects of Pandemics on History* (Cambridge: The Lutterworth Press, 1996), 10.

34 Richard F. Gombrich, *Theravāda Buddhism: A Social History from Ancient Benares to Modern Colombo* (London and New York: Routledge and Kegan Paul, 1988), 58–59.

> populations lacking any prior exposure or accumulated immunity. All that was needed to provoke spill-over from one pool to another was some accident of communication permitting a chain of infection to extend to new ground where populations were also sufficiently dense to sustain the infection either permanently, or at least for a season or two. The plague of Athens [in 430–429 BCE] seemed to have been such an episode; others undoubtedly occurred in India, China, and elsewhere without leaving any trace we can discover today.
>
> When, however, travel across the breadth of the Old World from China and India to the Mediterranean became regularly organized on a routine basis, so that thousands of individuals began to make a living by traveling to and fro, both on ship-board and by caravan, then conditions for the diffusion of infections among the separate civilizations of the Old World altered profoundly. The possibility of homogenization of those infections, whose most critical limit was defined by the number of new human hosts available day in and day out, opened up. It is my contention that something approximating this condition did in fact occur, beginning in the first century A.D.

McNeill continues (ibid., 128–129):

> During the two centuries that followed the beginning of the Christian era … it seems certain that trade between the eastern Mediterranean, India and China operated on a regular basis and attained a scale that dwarfed all earlier exchanges across such distances. Caravans passed overland across the oases and deserts of central Asia by regular stages, while ships travelled freely across the Indian Ocean and its adjacent waters.
>
> Regular movement to and fro across such distances implied exchange of infections as well as goods. Chances of an unfamiliar infection spreading among susceptible populations certainly multiplied, and there is reason to suppose that before the end of the second century A.D. epidemic disasters in fact struck severe blows to Mediterranean populations, and probably afflicted the population of China as well.

What about India? Did it too suffer epidemic disasters during that period? India certainly had its share of them in recent centuries, about which information is available.[35] Lack of information about the earlier period makes McNeill waver (ibid., 129):

35 See, e.g., Polu, *Infectious Disease in India*.

> Either the populations of Middle Eastern and Indian cities had little to fear from diseases previously established among the Chinese and Mediterranean populations …; or surviving records are so imperfect that disease disasters in Middle Eastern and Indian landscapes cannot now be detected.
>
> Indirect evidence suggests that exposure to new infection had little effect in either India or the Middle East. … In India, the political consolidation and cultural efflorescence of the Gupta age (A.D. 320–535) … suggests (though scarcely proves) that no particularly severe demographic disasters afflicted that country as a result of the merging of previously separate disease pools in the first Christian centuries.[36]

David Christian states, similarly:[37]

> New diseases had their greatest impact at the extremes of the Eurasian world system, in the Mediterranean and China, where earlier contacts had been most restricted. They had less impact in Mesopotamia and India, regions that lay closer to the hub of the Eurasian network of exchanges and were therefore more disease-hardened.

These passages should make us reflect. It seems impossible not to think of the de-urbanization considered above as at least in part the result of demographic disasters such as the arrival of major epidemics. Since no direct evidence is

36 About the Plague of Justinian and its aftermath, Bray (*Armies of Pestilence*, 27; cited in Ronald Findlay and Mats Lundahl, "Demographic Shocks and the Factor Proportions Model: From the Plague of Justinian to the Black Death," in *Eli Heckscher, International Trade and Economic History*, eds. Ronald Findlay et al (Cambridge, Massachusetts & London, England: MIT Press, 2006), 159) states: "Its distribution to the east of Syria is something of a puzzle. It would seem that the Arabs did not bring the plague back to the Hejaz … Equally it would seem that the Arabs did not bring the plague to Afghanistan, the Indus, Ferghana and Transcaucasia and thus into the Indian subcontinent and China, as all observers have the plague ceasing at about the present western border of Iran and the Caucasus." About the Black Death, George D. Sussman, "Was the Black Death in India and China?" *Bulletin of the History of Medicine* 85, no. 3 (2011): 322 observes: "Today, over thirty years after McNeill's *Plagues and Peoples*, we still cannot state with any degree of assurance whether the Black Death, which marked such a caesura in European history, even visited China or the Indian subcontinent in the fourteenth century, much less what impact it might have had in either of these civilizations." In spite of this, Sussman then argues that "the Black Death almost certainly did not appear in India in the fourteenth century."

37 David Christian, *Maps of Time: An Introduction to Big History* (Berkeley: University of California Press, 2004), 315.

available from India,[38] it will be useful to consider the Roman world, about which there is more evidence. As McNeill (*Plagues and Peoples*, 130 ff.) points out, there were at least eleven cases of pestilential disaster in republican times, the earliest dated 387 BCE. Another epidemic struck the city of Rome in 65 CE, followed by a far worse one from 165 to 180 CE, which killed in affected places probably as much as a quarter to a third of the entire population. An epidemic of similar magnitude hit the Roman world in 251–266 CE: five thousand a day are said to have died during its height in the city of Rome alone. The next conspicuously significant pestilence, called Justinian's plague, arrived in 542 CE and raged intermittently until 750.[39] Cities, with their high densities of population, were of course most prominently hit by epidemics.

The results of all this in the Western world are described as follows (ibid., 135):

> Political, economic, and cultural consequences of the intensification of micro- and macroparasitism[40] in the Mediterranean lands are too familiar to need much emphasis here. Repeated waves of barbarian invasion accompanied by the decay of cities, migration of artisans to the countryside, loss of skills (including literacy) and the breakup of imperial administration are the familiar hallmarks of the so-called Dark Ages in the West.

Indeed, after Justinian's plague "it is a fact … that all around the Mediterranean, the cities, as they had existed in antiquity, contracted and then practically

38 Veena Mushrif-Tripathy reminds me that little skeletal evidence is available because cremation was the main way to dispose of bodies. See V. Mushrif-Tripathy et al., "Where Are They Now? The Human Skeletal Remains from India," in *A Companion to South Asia in the Past*, eds. Gwen Robbins Schug and Subhash R. Walimbe (Chichester, West Sussex: John Wiley & Sons, 2016). Further Oskar von Hinüber, "Cremated Like a King: The Funeral of the Buddha within the Ancient Indian Cultural Context," *Journal of the International College for Postgraduate Buddhist Studies* 13 (2009): "The hope to find consolation in the archaeological evidence is almost immediately destroyed: Bones or ashes thrown into a river don't leave very significant traces for later archaeologists to discover. The same is true for the bones deposited at the foot of a tree near the site of a cremation." Charles Allen (*Coromandel: A Personal History of South India* (London: Little, Brown, 2017), 38) adds that also "the Indian porcupine's fondness for chewing old bones may be partly responsible" for the scarcity of human remains.

39 See William Rosen, *Justinian's Flea: The First Great Plague and the End of the Roman Empire* (Penguin Books, 2007).

40 Cf. McNeill, *Plagues and Peoples*, 24: "one can properly think of most human lives as caught in a precarious equilibrium between the microparasitism of disease organisms and the macroparasitism of large-bodied predators, chief among which have been other human beings."

disappeared."[41] Even without documents to support it, it seems reasonable to assume that epidemics hit India, too, during the early centuries of the first millennium.

Little is known about epidemics that hit the Indian subcontinent before relatively recent times.[42] Indeed, "absence of records permits no account whatever of Indian encounters with infectious disease before 1200."[43] For example, judging by the entry *disease* in Bollée's *Cultural Encyclopaedia of the Kathāsaritsāgara*,[44] the *Kathāsaritsāgara* does not mention epidemics.[45] But this does not mean that India had none. Consider, for example, the following verse from the *Atharvaveda*:

> To the Gandhāris, the Mūjavants, the Aṅgas, the Magadhas, like one sending a person a treasure, do we commit the fever (*takmán*).

This is *Atharvaveda* 5.22.14 in the Śaunakīya version, in Whitney's translation.[46] The association of the "fever" to regions and their inhabitants suggests that some kind of epidemic is meant.[47] The *Yugapurāṇa* (verse 92) mentions an epidemic (*janamāra*; trans. Mitchiner) as one of the afflictions that hit the country at the end of the Kali-Yuga, which for this text means during the second half of the first century BCE.[48] The *Rājataraṅgiṇī* (4.524–525) speaks of "a plague

41 Findlay and Lundahl, "Demographic Shocks," as cited in Rosen, *Justinian's Flea*, 261.

42 On China, see A. Morabia, "Epidemic and Population Patterns in the Chinese Empire (243 B.C.E. to 1911 C.E.): Quantitative Analysis of a Unique but Neglected Epidemic Catalogue," *Epidemiology & Infection* 137 (2009). It appears that the Romans played a role in spreading tuberculosis into Asia, including South-Asia; see Wilson, "Romans Helped TB Conquer the World," *New Scientist* 239, no. 3185 (7 July 2018), 10.

43 McNeill, *Plagues and Peoples*, 157; cited Ralph W. Nicholas, "The Goddess Śītalā and Epidemic Smallpox in Bengal," *Journal of Asian Studies* 41, no. 1 (1981): 23.

44 Willem Bollée, *A Cultural Encyclopaedia of the Kathāsaritsāgara in Keywords: Complementary to Norman Penzer's General Index on Charles Tawney's Translation*, Studia Indologica Universitatis Halensis 8 (Halle an der Saale: Universitätsverlag Halle-Wittenberg, 2015), 122.

45 To my knowledge there are no other relevant entries in this book.

46 In the Paippalāda versions, as Bahulkar ("The Tradition of the *Atharvaveda* in Varanasi," in *Vedic Investigations*, eds. Asko Parpola and Petteri Koskikallio (Delhi: Motilal Banarsidass, 2016), 3) points out, the word *aṅgebhyaḥ* "to the Aṅgas" has been replaced by *kāśibhyaḥ* "to the Kāśis."

47 Possibly malaria; Kenneth G. Zysk, "Fever in Vedic India," *Journal of the American Oriental Society* 103, no. 3 (1983). Polu (*Infectious Disease in India*, p. 82 ff.) calls malaria "India's true plague."

48 John E. Mitchiner, *The Yuga Purāṇa: Critically Edited, with an English Translation and a Detailed Introduction*, second revised edition (Kolkata: Asiatic Society, 2002), 93, 108, xxii.

caused by the *lūtā*-disease [which is] contagious and fatal" (*lūtāmayakṛtā vyāpad … āmayaḥ sparśasaṃcārī tatra vyāpādakaś ca saḥ*).[49] The Buddhist *Suttapiṭaka* appears to refer to an epidemic that hit the village called Nādikā.[50] The *Arthaśāstra* (8.4.1) includes disease (*vyādhi*) and epidemic (*maraka*) among the divine afflictions (*daivapīḍana*). It then presents the following discussion (trans. Olivelle):[51]

> "Between disease and famine, disease hurts undertakings by impeding the activities of workers who die or are sick or afflicted, whereas famine does not hurt undertakings and yields taxes in money and farm animals," say the teachers.
>
> "No," says Kauṭilya. "A disease afflicts a single region and remedies (*pratīkāra*) can be found for it, whereas a famine afflicts all the regions and deprives living beings of their livelihood."
>
> This also explains an epidemic.

Information about the remedies (*pratīkāra*) can be found elsewhere in the text (trans. Olivelle):[52]

> They should counteract the danger of disease through occult remedial measures, physicians through medicines, and thaumaturgic ascetics through pacificatory rites and penances.
>
> That also explains an epidemic. He should have these carried out: bathing at sacred fords, worship of Mahākaccha, milking cows in the cemetery, burning a headless trunk, and a gods' night.
>
> In the case of disease or epidemic affecting farm animals, he should have lustration rites of the stalls and equipment and the worship of their respective gods carried out.

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49 Vishva Bandhu, *Rājataraṅgiṇī of Kalhaṇa*, Part 1: *Taraṅga*s I–VII (Hoshiarpur: Vishveshvaranand Vedic Research Institute, 1963), 169 (with thanks to James McHugh).

50 DN, II, 91–92; cp. SN, V, 356; Hinüber, "Cremated Like a King," 42, 64.

51 *Arthaśāstra* 8.4.5–8: *vyādhidurbhikṣayor vyādhiḥ pretavyādhitopasṛṣṭaparicārakavyāyāmoparodhena karmāṇy upahanti, durbhikṣaṃ punar akarmopaghāti hiraṇyapaśukaradāyi ca ity ācāryāḥ / neti kauṭilyaḥ / ekedeśapīḍano vyādhiḥ śakyapratīkāraś ca, sarvadeśapīḍanaṃ durbhikṣaṃ prāṇināṃ ajīvanāyeti/ tena marako vyākhyātaḥ /*

52 *Arthaśāstra* 4.3.13–16: *vyādhibhayam aupaniṣadikaiḥ pratīkāraiḥ pratikuryuḥ, auṣadhaiś cikitsakāḥ śāntiprāyaścittair vā siddhatāpasāḥ / tena marako vyākhyātaḥ / tīrthābhiṣecanaṃ mahākacchavardhanaṃ gavāṃ śmaśānāvadohanaṃ kabandhadahanaṃ devarātriṃ ca kārayet / paśuvyādhimarake sthānārthanīrājanaṃ svadaivatapūjanaṃ ca kārayet /*

Epidemics, we learn from the first of these two passages, afflict a single region at a time. No further details are given.

Medical literature sometimes mentions the "destruction of land and people" (*janapadoddhvaṃsa*), an expression that covers both epidemics and other forms of mass destruction. Particularly relevant in this context is a chapter of the *Carakasaṃhitā* (*Vimānasthāna* 3).[53] Most important for our present purposes is that this text (and certain others) shows awareness of the existence of epidemics, confirming our claim that ancient India did have its share of those. The texts do not provide information about specific epidemics, and indeed, as Ernst Prets reminds me, they may not have recognized epidemics as such, being largely unaware of infection and infectious diseases.[54]

This same chapter of the *Carakasaṃhitā* contains a passage that suggests a link between epidemics and those who engage in commerce, among others. This would imply that those who made their livelihood of commerce were, to at least some extent, held responsible for epidemics. This in its turn would fit in with our thesis that Brahmanical disapproval of commerce and other urban activities was one of the factors that contributed to the emptying of cities. The passage reads, in Wujastyk's translation (my emphasis, JB):[55]

53 See Vitus Angermeier, *Über die Auslöschung von Land und Leuten: Die Ursachen von Massensterben und Schutzmaßnahmen gegen diese gemäß Carakasaṃhitā Vi. 3* (Wien 2010); Dominik Wujastyk, *The Roots of Āyurveda: Selections from Sanskrit Medical Writings* (London and New Delhi: Penguin Books 1998), 79–92; Jan G. Meulenbeld, *A History of Indian Medical Literature. Volume IA: Text* (Groningen: Egbert Forsten, 1999), 31–32.

54 Note, however, that Wujastyk (*Roots of Āyurveda*, 83, n. 38) thinks there is "an explicit, though unelaborated, reference to disease contagion through touch" in the sentence *tata uddhvaṃsante janapadāḥ spṛśyābhyavahāryadoṣāt* (Vi. 3.20) "Then they bring epidemic destruction on the localities, because of the corruption in what one touches, and in what is edible" (trans. Wujastyk); "Daraufhin werden Land und Leute aufgrund der schädlichen Beschaffenheit von Spürbarem und Essbarem ausgelöscht" (trans. Angermeier). On contagion in classical Indian medicine, see further Rahul Peter Das, "Notions of 'Contagion' in Classical Indian Medical Texts," and Kenneth G. Zysk, "Does Ancient Indian Medicine Have a Theory of Contagion?" in *Contagion: Perspectives From Pre-Modern Societies*, eds. Lawrence I. Conrad and Dominik Wujastyk (Aldershot: Ashgate 2000).

55 Dominik Wujastyk, *Roots of Āyurveda*, 83. *Vimānasthāna* 3.20: *yadā vai deśanagaranigamajanapadapradhānā dharmam utkramyādharmeṇa prajāṃ vartayanti, tadāśritopāśritāḥ paurajanapadā vyavahāropajīvinaś ca tam adharmam abhivardhayanti, tataḥ so 'dharmaḥ prasabhaṃ dharmam antardhatte, tatas te 'ntarhitadharmāṇo devatābhir api tyajyante; teṣāṃ tathā 'ntarhitadharmaṇām adharmaṇām adharmapradhānānām apakrāntadevatānām ṛtavo vyāpadyante … tata uddhvaṃsante janapadāḥ spṛśyābhyavahāryadoṣāt.*

> [W]hen the leaders in a district, city, guild, or community transgress virtue, they cause their people to live unrighteously. Their subjects and dependents from town and country, and **those who make their living from commerce**, start to make that unrighteousness grow. The next thing is that unrighteousness suddenly overwhelms virtue. Then, those whose virtue is overwhelmed are abandoned even by the gods. Next, the seasons bring calamity on those whose virtue has thus been overwhelmed, on those who have unrighteous leaders, on those who have been abandoned by the gods. … Then they bring epidemic destruction on the localities, because of the corruption in what one touches, and in what is edible.

Epidemics are mentioned from time to time, but rarely, in Indian narrative literature. The *Avadānaśataka*, a Buddhist text, does so in stories no. 14 (which uses the expressions *īti* and *mahājanamaraka*), 16 (*mahatī ītiḥ*), 31 (*pāṇḍuroga*),[56] as does another Buddhist text, the *Divyāvadāna*.[57] The *Kuvalayamālā*, a Jaina text from the eighth century CE, mentions epidemics in one place (274.9).[58] John Cort (2004: 402–403) mentions some Jaina texts that were presumably composed to remove plague and cholera from local congregations. It is possible, but not certain, that a copper-plate inscription from the first century CE refers to small-pox.[59]The following threat to kings, which occurs in the Laws of Manu (*Mānavadharmaśāstra* 8.22), is also worth noting:

> The entire realm, stricken with famine and pestilence (*vyādhi*), quickly perishes, when it is teeming with Śūdras, overrun by infidels, and devoid of twice-born people.
>
> trans. OLIVELLE

56 Avś(V), 36, 42, 78. Cf. Naomi Appleton, "The 'Jātakāvadānas' of the Avadānaśataka: An Exploration of Indian Buddhist Narrative Genres," *Journal of the International Association of Buddhist Studies* 38 (2015): 13–14.

57 Divy, 578, l. 23; Divy(V), 487. See also Gregory Schopen, *Buddhist Nuns, Monks, and Other Worldly Matters: Recent Papers on Monastic Buddhism in India* (Honolulu: University of Hawai'i Press, 2014), 289–292.

58 To be more precise, Christine Chojnacki (*Kuvalayamālā: Roman jaina de 779 composé par Uddyotanasūri*, 2 vols. (I: Étude, II: Traduction et annotations), Indica et Tibetica 50, vols. 1–2 (Marburg: Indica et Tibetica Verlag, 2008), II, 749) uses the term *épidémie* in her translation. Having no access to the original, I do not know what Prakrit word this translates.

59 Harry Falk, "The First-Century Copper-Plates of Helagupta from Gandhāra Hailing Maitreya," *Annual Report of the International Research Institute for Advanced Buddhology at Soka University* (ARIRIAB) 17 (2014): 7–8. Vijay Kumar Thakur (*Urbanisation in Ancient India* (New Delhi: Abhinav, 1981), 297–298) refers to a number of textual passages that deal with what are presumably pestilence and plagues, but none of them are very explicit.

If, then, major epidemics hit the Indian cities—and we have seen that this is a plausible assumption—the effects on at least a number of them may well have been strong and long lasting. In combination with a prevailing Brahmanical ideology, such epidemics might account for the emptying out of certain cities that would subsequently, under pressure from the Brahmanically influenced courts, not be able to re-establish themselves.

We have so far considered two factors that may have contributed to, or even caused, the emptying of certain cities: Brahmanical ideology and epidemics. Are these two factors independent of each other? Or are they somehow linked? A remark in McNeill's already often-cited book makes one wonder. He states (*Plagues and Peoples*, 91): "the taboos on personal contact across caste lines, and the elaborate rules for bodily purification in case of inadvertent infringement of such taboos, suggest the importance fear of disease probably had in defining a safe distance between the various social groups that became the castes of historic Indian society." Sonia Shah, referring to this passage, points out that "[o]f all the various factors that could potentially predict the level of ethnic diversity in a given region, pathogen diversity is one of the strongest."[60] Other authors, too, confirm that fear of disease can affect the ways people interact: "Worrying about parasitic infection correlates with anti-immigrant attitudes, and such biases are heightened at times when people feel more vulnerable to infection;"[61] "pathogen threats strengthen in-group affiliation and solidarity (e.g. ethnocentrism, closeness to family), which creates a supportive network should someone in the group become sick."[62] In view of such observations, it appears that Brahmanism may have found a fertile ground for its hierarchical ideology in a world where infectious diseases took their toll. Brahmanical ideology was perhaps not a response to the threat of infectious diseases (even though this may conceivably have played a role), it certainly could flourish in their presence.

The growing influence of Brahmanism left other traces, too. A recent study of the genomes of a large number of individuals in India comes to the conclusion "that the practice of endogamy was established almost simultaneously,

60 Sonia Shah, *Pandemic: Tracking Contagions, from Cholera to Ebola and Beyond* (New York: Sarah Crichton Books, 2016), 194 (with a reference to Elizabeth Cashdan, "Ethnic Diversity and Its Environmental Determinants: Effects of Climate, Pathogens, and Habitat Diversity," *American Anthropologist* 103, no. 4 (2001)).

61 Harriet A. Washington, *Infectious Madness: The Surprising Science of How We "Catch" Mental Illness* (New York, Boston, and London: Back Bay Books, 2015), 175.

62 Ilan Shrira, Arnaud Wisman, and Gregory D. Webster, "Guns, Germs, and Stealing: Exploring the Link between Infectious Disease and Crime," *Evolutionary Psychology* 11, no. 1 (2013), 271; quoted by Washington, *Infectious Madness*.

possibly by decree of the rulers, in upper-caste populations of all geographical regions, about 70 generations before present, probably during the reign (319–550 CE) of the … Gupta rulers."[63] Also an earlier study found evidence for a shift to endogamy, at different moments for speakers of Indo-European languages (on average 72 generations) and those of Dravidian languages (108 generations).[64] The authors of this study translate these numbers of generations into 1900 and 3000 years before present respectively. It is virtually impossible to determine the exact average length of a generation, yet it seems safe to conclude that a shift to endogamy took place during the first half of the first millennium CE, at least in northern India,[65] and it is permitted to assume that the growing influence of Brahmanism played a role in this shift. The question of a possible link between endogamy and rural living remains open for the time being.

What can we conclude from the above? The answer to this question can be brief: in order to correctly assess the cultural, economic, ideological and perhaps political developments in India, it is vital to realize that infectious diseases may have played an important or even determining influence.

Abbreviations

ĀpDhS	*Āpastambadharmasūtra*
Avś(V)	*Avadānaśataka*, ed. P.L. Vaidya, Darbhanga 1958 (BST 19)
BaudhDhS	*Baudhāyanadharmasūtra*
BORI	Bhandarkar Oriental Research Institute, Pune
BST	Buddhist Sanskrit Texts, Darbhanga
Divy	*Divyāvadāna*, ed. E.B. Cowell, R.A. Neil, Cambridge, 1886
Divy(V)	*Divyāvadāna*, ed. P.L. Vaidya, Darbhanga, 1959 (BST 20)

63 Analabha Basu, Neeta Sarkar-Roy, and Partha Majumder, "Genomic Reconstruction of the History of Extant Populations of India Reveals Five Distinct Ancestral Components and a Complex Structure." *Proceedings of the National Academy of Sciences* (*PNAS*) 113, no. 6 (2016), 1595.

64 Priya Moorjani et al., "Genetic Evidence for Recent Population Mixture in India," *The American Journal of Human Genetics* 93, no. 3 (2013), esp. 426.

65 Interestingly, the study of Moorjani et al. leaves us with the suspicion that endogamy had been adopted in the Dravidian south a full thousand years before the north, thus suggesting that something like a "caste system" existed there already before and independently of Brahmanical influence. Is it possible that the greater prevalence of infectious diseases in the (warmer) south played a role in this?

DN	*Dīghanikāya*, ed. T.W. Rhys Davids, J.E. Carpenter, 3 vols., 1890–1911 (PTS)
GautDhS	*Gautamadharmasūtra*
Kane, HistDh	Pandurang Vaman Kane, *History of Dharmaśāstra*, 5 vols., second edition, Poona: Bhandarkar Oriental Research Institute, 1968–1977
Mhbh	*Mahābhārata*, crit. ed. V.S. Sukthankar a.o., Poona: BORI, 1933–1941
PTS	Pali Text Society, London
SN	*Saṃyutta-Nikāya*, ed. L. Feer, 5 vols., London: PTS, 1884–1898; vol. 6 (indexes by C.A.F. Rhys Davids), London: PTS, 1904
VasDhS	*Vasiṣṭhadharmasūtra*

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