Pāṇini's Aṣṭādhyāyī. *A Turning Point in Indian Intellectual History*

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1 Introduction

An ancient tradition[1] claims that Pāṇini, the author of the *Aṣṭādhyāyī*, was born in the village of Śalātura in Gandhāra (near modern Islamabad in northern Pakistan). This snippet of biographical information (so rare for most authors in the history of ancient and medieval India) is of crucial importance because it allows us to situate Pāṇini in that part of India that in the late 6th century BCE came under the control of the Achaemenid empire. Even though the grip of the Achaemenid power over its easternmost territories seems to have been relatively tenuous, the encounter with Persian culture allowed the transfer of major cultural forms and ideas to the Indians.[2] Most notably, it is virtually certain that it led to the introduction of writing into India, thus causing its transition from orality to literacy, the importance of which would be

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[1] The oldest dated attestation of this epithet is in the Alina copper plate (*Corpus Inscriptionum Indicarum*, vol. III, pp. 171-180), from 766-67 CE (see Agrawala 1953: 10).

[2] See e.g. Pingree 1973 on the transmission of astronomical knowledge.

hardly overestimated.[3] As Pāṇini is generally dated to the mid 4th century BCE,[4] this means he may have belonged to one of the first generations of Brahmans to be exposed to the use of writing.

In the following pages I will argue that the newly-acquired literacy played a decisive role in the emergence of the post-Vedic grammatical scholarship that culminated in the composition of Pāṇini's *Aṣṭādhyāyī*, which marks the beginning of classical *vyākaraṇa*. Furthermore, and perhaps of even greater historical consequence, is the fact that Pāṇini's early grammatisation of Sanskrit was arguably one of the key factors in the emergence of Sanskrit as the dominant language of culture in South Asia and beyond for centuries to come.

2 The invention of Kharoṣṭhī

The earliest testimonies of the use of writing in India are the monumental inscriptions of the Maurya emperor Aśoka (mid 3rd century BCE). While most of these are in Brāhmī, the progenitor of all later Indian scripts, two in the north-west of the subcontinent are in the other early Indian script, Kharoṣṭhī,[5] which was used for a few centuries in "greater" Gandhāra and as far as central Asia and eventually died out. It is generally admitted that Kharoṣṭhī (which, unlike Brāhmī, is written

[3] There has been surprisingly little research and reflection in modern Indology on the effects of the introduction of literacy in ancient India (ironically, often aimed to emphasise its extraordinary "memory culture": see e.g. Staal 1986, Houben and Rath 2012). On this topic see also Bronkhorst 2002 and Witzel 2011.

[4] See von Hinüber (1989: 34). A date around this time had been already proposed on the basis of contextual evidence by earlier scholars (for a survey of the views and the supporting evidence, see Cardona 1976: 260-268).

[5] For the origin and meaning of the name Kharoṣṭhī, which remains uncertain, see the survey of views in Salomon (1998: 50-51). On the Aśokan inscriptions in this script, see Hultzsch (1925: 50-84).

from right to left) was derived from the Aramaic script used by the administration of the Achaemenid state, as Georg Bühler established in 1896,[6] but the exact historical circumstances in which this technological transfer took place are obscure, since archaeological research has shown that in the Indian satrapies "there is minimal evidence for direct Achaemenid control, and good evidence for the maintenance of local authority" (Petrie and Magee 2012: 18).

We can surmise that from ca. 500 BCE, in Gandhāra and the other Indian lands under Achaemenid rule there was some amount of imperial administrative activity, which relied on the use of the Aramaic script.[7] This would have made the local society aware of the uses and purposes of writing, and the advantages it could bring to several areas of human activity, triggering a sustained and eventually successful effort to create a script for the local languages (I guess these included Sanskrit and some early variety of the Gāndhārī Prakrit that is known from the somewhat later Buddhist manuscripts found in the region).[8] No contemporary or later account has survived of this effort, and we do not know who carried it out (it may have been administrators, traders, or learned Brahmans, or a combination of these), how they went about their task, whether it was a spontaneous, informal process, or there was some kind of "institutional" support.

Several scholars have suggested that the "grammarians" (i.e. practitioners of Vedic disciplines such as *śikṣā* and *vyākaraṇa*) may have been involved in the creation of scripts – first Kharoṣṭhī and later Brāhmī – suitable to Indic languages,

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[6] Bühler 1896 [1904: 92-114].

[7] That there was some diffusion of Aramaic in Gandhāra is suggested by the two Aśokan inscriptions in that language and script found in the region (Mukherjee 1984), several decades after the end of the Achaemenid rule.

[8] On this topic, see Salomon 2018.

contributing to it with their advanced knowledge of phonology.[9] In a relatively short span of time, in fact, the creators of Kharoṣṭhī developed signs for Indic consonants not found in Aramaic, such as aspirate and retroflex stops. On the other hand, it is worth noting that early Kharoṣṭhī, as attested in the Aśokan inscriptions, did not distinguish between short and long vowels, and had no way to mark either vowelless or geminated consonants, or *visarga*. It also lacked signs for the vowels /ṛ/, /ḷ/, /ai/ and /au/, and for the consonant /ṅ/. Thus, Kharoṣṭhī appears more appropriate to some variety of Prakrit, where most of the missing features are not found, than Sanskrit.

However, even assuming the grammarians' contribution to the creation of Kharoṣṭhī, it is hardly surprising that, at the dawn of literacy in India, the first prototype was somehow imperfect despite the advanced linguistic knowledge of late Vedic Brahmans. Even today, after millennia of literacy in various areas of the globe, virtually all the alphabets in current use for any language are at best approximate (and yet effective) representations of the spoken languages. Expecting the Sanskrit grammarians to help produce the perfect script from scratch at their first attempt would be unrealistic, to say the least.

Moreover, a possible explanation for the lack of distinction between long/short vowels is that the pandits approached their task with a phonetician's mindset: if their primary "theoretical" goal was to establish a grapheme for each phoneme in the language, identified on the basis of its points of articulation plus (in the case of consonants) traits such as ∓voicedness and ∓aspiration, without (initially) paying attention to their distinctive value, they may have judged a trait such as ∓length (for both vowels and consonants) of minor importance since the basic articulatory effort is identical. As for the claim that Kharoṣṭhī lacked signs for some Sanskrit vowels,

[9] See e.g. Goyal, quoted in Salomon 1998: 21; Dani 1963: 29-30; Scharfe 2009: 73.

or *visarga*, one cannot rule out the possibility that this is simply a consequence of the fact that the earliest attestations of the script are epigraphical documents in Māgadhī Prakrit, where these sounds do not occur. It may well be that a version of Kharoṣṭhī more adequate to the notation of Sanskrit had been developed, but no documents survive because of the perishable nature of the material supports.[10] Furthermore, there are other subtle but decisive clues, I believe, pointing to a prolonged prehistory of writing in the north-west of the Indian subcontinent and to the involvement of local Brahmans,[11] as I will argue in the next paragraph.

3 The role of writing in the rise of post-Vedic grammar

There is no way to gauge the impact that the introduction of writing around 500 BCE had on the contemporary Gandhāran society as a whole, but one particular social group – the local Brahmanical community – were in a unique position to intuit the potential of writing and put it to good use in relation to their intellectual and existential concerns. As is well known, by that time the language-related Vedāṅgas – *śikṣā*, *vyākaraṇa* and *nirukta* – already had a long history behind and were deeply entrenched in Brahmanical culture. The transition from "epilinguistic" knowledge – i.e. unorganised ideas about language as probably exist in all cultures – to proper linguistic knowledge, with the systematic collection of data (for ex. on the phonology

[10] The surviving Kharoṣṭhī documents in Sanskrit (admittedly from a much later period than the one concerning us here) have characters and graphic devices for virtually all the missing sounds, as Rapson and Noble (1929: 295) note. They illustrate the "additional" signs and devices in the following pages (296-322). It cannot be excluded that some of these or equivalent ones already existed in Pāṇini's time.

[11] I assume that Pāṇini and his predecessors were Brahmans, since in ancient India this social group had the virtual monopoly of scholarly activities, and particularly those related to Sanskrit, but of course we cannot know for sure.

of Sanskrit), their organisation into consistent (albeit partial) proto-theoretical schemes, and the formation of an appropriate metalanguage, can be assumed to have begun and have made considerable progress well before Pāṇini's time. It is easy to imagine that the Brahmans of Gandhāra, endowed with a rich and sophisticated legacy of linguistic knowledge, quickly realised the significance of writing and applied the new technology to the study of language. The newly-acquired literacy allowed them to expand their inquiries in what seems to have been an unprecedented direction, broadening the scope from the study of the language of specific closed corpora – the Vedic texts, and particularly the Saṃhitās with the corresponding Padapāṭhas (themselves a testimony to the growth of grammatical thought) – to the study of the language as a whole.

I think writing played a crucial role in this endeavour. Would it be possible for a full-fledged grammatical speculation – not just a sophisticated grammar such as Pāṇini's but any grammar – to arise in a primary oral culture? In his 1994 book *La révolution technologique de la grammatisation*, the French historian of science Sylvain Auroux looks at different instances of grammatisation worldwide (especially in the Ancient Near East and the Mediterranean region), emphasising that the birth of grammar seems by necessity to depend upon and hence follow the appearance of writing. He notes that, while most cultures appear to have some kind of epilinguistic knowledge, some idea of what language is and how it functions, the transition to metalinguistic knowledge is only made possible when "language is posited as an object. It must be there, before us, a manifestation of itself rather than of something else, contrary to what happens in its daily use. The process of the appearance of

writing […] is a remarkable process of objectification, without any previous parallel" (Auroux 1994: 47).[12]

In other words, for grammatical knowledge to emerge and – even more – to establish itself as a system, the object language must exist outside the head of the grammarian or the ephemeral verbal exchanges of oral communication. It must have some degree of stability and permanence that makes the task of observation and collection of linguistic facts feasible, allowing the systematic accumulation and storage of data, and their reiterated verification.

One could imagine, in fact, that this was also one of the conditions leading to the birth of Vedic grammatical thought, as we know it through the Padapāṭhas and the Prātiśākhyas.[13] It has often been noted that Vedic memorisation was of a different, higher order than what is normally observed in primary oral cultures, as it strove to preserve and transmit the texts in pristine form.[14] One of the consequences of this unique attitude is that in this way the text of a given Vedic Saṃhitā enjoyed a permanence that was independent of the individual reciter's memory, as it existed in precisely the same form in the memory of any other reciter of the same school (possibly tens or hundreds of them) and as such was revived, as it were, at any public performance. This may have facilitated the kind of proto-grammatical analysis[15] that

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[12] "… il faut que le langage soit placé en position d'objet. Il faut qu'il soit là, manifestation de lui-même et non pas d'autre chose, contrairement à ce qui se passe dans son usage quotidien. Le processus d'apparition de l'écriture … est un processus d'objectivation considérable et sans équivalent antérieur." (Auroux 1994: 47; my translation).

[13] In their present form some of these works are certainly post-Pāṇinian (see Cardona 1976: 273-275), but their prototype conceptually belong to a cultural horizon that is older, as I contend below.

[14] See e.g. Staal (1986: 26-27) who distinguishes "oral epic" (= "loose orality") transmission from "Vedic" (= "fixed orality") transmission.

[15] On the emergence of grammatical thought in Vedic literature, See Liebich 1919, Palsule (1961: 1-24), Deshpande 1996.

led to the separation of sentences into words (i.e. parts of speech), the realisation of the *sandhi* phenomena, the identification of some declensional endings, the separation of nominal compounds into their members, etc., as are found in Padapāṭhas and, to some extent, codified in Prātiśākhyas.

However, from a theoretical and methodological point of view, the conceptual challenge posed by the object language of Pāṇini's grammar – the everyday language – is clearly incomparably more complex that that facing the authors of Padapāṭhas and Prātiśākhyas. The latter dealt with the language of a closed corpus, which was by definition fixed and unchangeable. Conversely, Pāṇini's object is open-ended, so his apparatus of rules must be capable of generating countless correct Sanskrit utterances. To put it differently, Pāṇini's grammar is meant to have a predictive value: e.g., a sentence that refers to an agent performing an action will contain two abstract elements P (*prātipadika* = noun/pronoun) and D (*dhātu* = verb) such that semantically the denotatum of P is the agent of the action expressed by D. On the basis of the instructions found in the *Aṣṭādhyāyī*, one should be able to derive a correct sentence for any lexical values of P ($P_{1,2,3,}$ etc.) and of D ($D_{1,2,3,}$ etc.).

Moreover, Pāṇini's grammar does not simply record the linguistic facts in a systematic fashion, but rather expounds the laws underlying those facts, seeking to achieve maximum economy (*lāghava*) of description through the highest possible level of generalisation (*sāmānya*). Such a degree of abstraction and formalisation is only made possible, I believe, by the use of writing, which considerably facilitates the task of breaking down the spoken chain of speech into its components and subcomponents. In the terminology of the later Pāṇinīyas, this implies two processes: *apoddhāra* (lit. "extraction"), i.e. dividing the sentence/utterance (*vākya*) into inflected words (*pada*); and *vibhāga*, analysing words into base (*prakṛti*) and affix (*pratyaya*). Such operations, made possible (or at least potentiated to an

unprecedented extent) by writing, relocate speech from the temporally ephemeral aural dimension of personal, direct verbal communication to the spatially stable and somewhat depersonalised visual dimension of the written text.

Whether Pāṇini knew and used writing has long been debated in Indological studies. Already Goldstücker (1861) argued at length in favour of this hypothesis in response to Max Müller who had categorically rejected it.[16] A survey of the various positions and arguments in the debate – interesting as it may be – is beyond the scope of this article. I will just notice that, besides rightly reminding that there is no material evidence of the use of writing in India before Aśoka, scholars who are sceptical about Pāṇini's recourse to writing in the composition of the *Aṣṭādhyāyī* generally point to the strong "memory culture"[17] of ancient and medieval India, which I have also recalled earlier in connection with the achievements of Vedic grammar. They maintain that the oral transmission of the *Aṣṭādhyāyī*, a relatively short and compact text that can be recited from beginning to end in a couple of hours, would have been a minor feat for a culture that cultivated extraordinary mnemonic techniques enabling certain individuals to memorise thousands of texts, both in verse and – it seems – in prose.

Now, there is virtually no doubt that for centuries the oral transmission and teaching of the *Aṣṭādhyāyī* played an important role in the Pāṇinian tradition. And of course, the *sūtra* genre (of which the *Aṣṭādhyāyī* is possibly the most refined example), characterised by exceptional conciseness, is meant to ease and support memorisation. However, composing an exhaustive grammar of a language is not just a matter of memory, but it presupposes a true and profound cognitive leap as it

[16] "I maintain that there is not a single word in Pāṇini's terminology which presupposes the existence of writing" (Müller, quoted in Goldstücker 1861: 45).

[17] See e.g. Staal 1986, Falk 1990, Scharfe 2009, and Witzel 2011; cf. also Houben and Rath 2012: 20.

involves complex intellectual operations that are likely unconceivable (or at the very least very unlikely to occur) in a primary oral culture. It is certainly possible, in theory, that Vedic culture, with its cultivation of powerful mnemonic skills and its well-attested tradition of textual transmission, may have been unique among ancient cultures in producing a massive body of literature and preserving it for centuries with relatively few changes. But, as Bronkhorst (2002: 804) remarks, "the oral composition of a work as complex as Pānini's grammar is not only without parallel in other human cultures, it is without parallel in India itself. […] here the least one can ask for is some kind of indication as to how Panini did it". Aware of the complexity of the grammar, Staal (1986: 36-37) comes up with an imaginative scenario to explain its composition: according to him, Pāṇini might have relied on the help of a circle of collaborators (somewhat like a painter or sculptor in a workshop), with different parts of the work in progress being memorised by junior colleagues or pupils and recalled at the teacher's request. Leaving aside the fact that very little is known about compositional practices in ancient India, Staal's hypothetical scenario (with Pāṇini's collaborators as "living note blocks") might possibly explain some organisational aspects of the process of creation, but in my opinion it does not provide a convincing explanation of how such an grandiose and ambitious intellectual enterprise as Pāṇini's grammar may have been *conceived* in a purely oral culture. Subscribing to Staal's conclusions, Falk (1990) defends the idea that Pāṇini's work was composed orally, claiming that, if "it is difficult for us to imagine today how such an intricate system could have been developed without writing ... this is our fault and not Pāṇini's". In other words, Falk's stance seems to be that, since there is no hard proof that writing was in use in Gandhāra in Pāṇini's time, we have to accept that extraordinary levels of abstraction and formalisation of knowledge (such as are found in Pāṇini's grammar) can be achieved even in the

absence of literacy – not a particularly robust argument, as noted by Bronkhorst (2002: 804). In partial disagreement with Falk, Scharfe (2009) and Witzel (2011) have both come to the conclusion that Pāṇini probably knew of writing but composed and transmitted his work orally. However, their arguments essentially rest on the perceived inadequacies of Kharoṣṭhī to represent Sanskrit. They gloss over the challenge the grammar posed at *compositional* level and focus instead on aspects such as the lack of distinction between long and short vowels (for which I have tentatively suggested an explanation above), or of nasalisation marks for *anubandha* vowels. These shortcomings might have indeed been problematic if the circulation and transmission of the grammar had mainly relied on the written text without the accompanying support of oral teaching. However, this seems an unlikely scenario: we are talking, in fact, of the circulation of a highly technical text among a small number of potential new users/readers in a culture that had just barely (and no doubt only partially) acquired literacy. At least initially, there was no pre-existing public (audience/readership): this had to be created through training, and it could certainly be taught to distinguish e.g. between short and long vowels even if they were graphically represented by the same sign – just as any English speaker (even a non-native one) will easily distinguish between "bow" (the weapon) and "bow" (a gesture of respect) according to the context.

Thus, vague arguments about powerful memorisation and oral transmission are used to question and dismiss the possibility that the origin of classical, i.e. post-vedic *vyākaraṇa*, may be linked to the introduction of literacy. I propose instead to pay close attention to the structure and wording of the *Aṣṭādhyāyī* (our primary piece of evidence) in order to arrive at a plausible picture of the historical, cultural and cognitive conditions that presided over its composition. In the following pages I will examine a number of features of Pāṇini's grammar that I think reveal his reliance on

writing. But before turning to the internal evidence pointing to the use of writing, I would like to draw attention to a frequently overlooked phase in the prehistory of Pāṇinian grammar.

4 Pāṇini's predecessors

Surely, Pāṇini's oeuvre was not the work of an isolated genius but the culmination of a long tradition of grammatical studies. Here I do not mean the Vedic tradition of *vyākaraṇa* as a Vedāṅga, even though this was undoubtedly an essential part of his background. Many authors have noted similarities in the methodology and practice of these earlier texts and Pāṇini's system (see e.g. Cardona 1969: 24, on the method of description reflected in the *Śivasūtra*s[18]). Rather, what I have in mind is the formidable, but virtually anonymous effort of **analysis** of the Sanskrit language that is presupposed by Pāṇini's grammar. As is known, his work teaches how to combine abstract elements – bases and affixes – through a process of **synthesis** leading to the formation of correct words and sentences. However, the massive collective labour that led to the identification of these elements – verbal roots, nominal and verbal endings, primary (*kṛt*) and secondary (*taddhita*) suffixes, etc., which are given as such in the *Aṣṭādhyāyī* and its ancillary texts – is basically unknown because no contemporary records of it exist (and if they ever did, they have not survived), and hardly any mention of it is made in the early commentarial literature.

[18] This short work, also known as *Pratyāhārasūtra*s, is a list of the sounds of Sanskrit (divided into fourteen parts, each ending with a consonantal *anubandha*, a marker or tag, for which see below), which precedes the *Aṣṭādhyāyī* and is presupposed by many of its rules. For a detailed treatment, which is beyond the scope of this article, see Cardona 1969.

There is an undeniable gap between the kind of grammatical knowledge exhibited in the extant pre-Pāṇinian works and the wealth of data, related to even the minutest details of a highly inflected language such as Sanskrit, available to and used by Pāṇini in formulating the rules of his grammar. The painstaking work of isolating and classifying the morphemes of the language, which is attested in its initial stages in pre-Pāṇinian works (and, it is worth reiterating, only in relation to particular closed literary corpora), must have been carried out by a few generations of grammarians before Pāṇini. It seems indeed very likely that others before him had composed grammatical works of the derivational kind, teaching how to re-combine the extracted elements into correct words and sentences. In the *Aṣṭādhyāyī* Pāṇini himself quotes by name ten earlier grammarians, and to some extent he resorts to inherited terminology – surely because the use of these terms was well-established in grammatical circles, but probably also because in this way he laid claim to being part of a legitimate tradition of learning.[19] My hypothesis is that these unknown pioneers were north-western Brahmans, well-versed in Vedic *vyākaraṇa*, who were among the first Indians who had recourse to writing. Having appropriated the new technology, they engaged in the titanic effort of observation, collection, and systematisation of linguistic data that eventually led to the composition of the *Aṣṭādhyāyī*. The complexity of the *Aṣṭādhyāyī* is the testament to the linguistic insight of these forgotten authors. And it is in the *Aṣṭādhyāyī*, the sole surviving text of its kind from that age, that we can find proof that Pāṇini's accomplishments (and those of his predecessors) were made possible by writing, as I will show in the next paragraph.

[19] None of these grammars has survived, probably condemned to oblivion by the success of Pāṇini's work. For a survey of the references to other grammarians in the *Aṣṭādhyāyī* and early commentaries, as well as the secondary literature on this topic, see the section "Evidence of pre-Pāṇinian grammarians" in Cardona (1976: 146-148).

5 Clues to literacy in the *Aṣṭādhyāyī*

That Pāṇini knew of writing is pretty much certain as the *Aṣṭādhyāyī* mentions the compound *lipikāra* (with the variant *libikāra*) "scribe" in A.3.2.21. Salomon (1998: 46) thinks it likely that the script (*lipi*) in question is Kharoṣṭhī, even though some authors (e.g. von Hinüber 1989: 58; Falk 1993: 258) have argued that it might be Aramaic (not without reason, since no evidence of pre-Aśokan Kharoṣṭhī has been found yet). And of course, Pāṇini might have been aware of the existence of writing (and of the scribal craft) without being himself literate.

Nevertheless, I think that several features of the system expounded in the *Aṣṭādhyāyī* indicate that Pāṇini had access to a bi-dimensional (i.e. spatial) representation of language as is only conceivable in a literate culture. In the *Aṣṭādhyāyī*, even more than in any other ancient grammar, the elements of the language are de-contextualised and rearranged, breaking away from the linearity of the spoken sequence. It is certainly possible for the members of a primary oral culture to notice the regular occurrence of certain common segments of speech: nouns, which are often also the names of people, animals, plants, things, etc.; adjectives; verbs, with their typical endings, if the language has conjugations; and so on. This is all the more so if the culture in question – like Vedic culture – is characterised by an overwhelming preoccupation with language, its formal, semantic and aesthetic features, and its power to affect and modify reality. However, compared to the observation of regularities in the language of a literary corpus, the effort to extract elements from the innumerable set of possible utterances of a natural language is on a different level of abstraction, scope and ambition – a level that is only made possible by literacy. Here I examine some of the devices, procedures, and terminology

employed in the *Aṣṭādhyāyī* that, in my opinion, are strongly suggestive of Pāṇini's reliance on writing.

Lists

Listing is certainly possible in a primary oral context,[20] but it is usually dictated by contingent needs, whether it is the ceremonial recitation of a list of kings or, say, the everyday enumeration of things or individuals related to a given task or event (e.g. the ingredients of a recipe, the guests at a party, etc.). In Pāṇini's grammar, we find lists of abstract items (i.e. items that are generally not found as such in ordinary speech production), which are grouped together on the basis of their functional, formal, or semantic characteristics – shared traits that normally escape the linguistic awareness of ordinary speakers.

The purpose of these lists is to serve as aids in the description of the laws and structures of the Sanskrit language and, to some extent, provide an exhaustive inventory of certain basic components – highly theoretical tasks with no evident connection to or impact on the immediate concerns of the speakers. Among them, for example, we find 261 lists (*gaṇa*)[21] of nominal items that either 1) fall in the same category and therefore receive the same *saṃjñā*, i.e. technical name: e.g. the *svarādi* list of indeclinables (*avyaya*, in A.1.1.37, *svarādinipātam avyayam*), the *prādi* list of particles (*nipāta*, in A.1.4.58, *prādayaḥ*), or the *sarvādi* list of pronouns (*sarvanāma*, in A.1.127, *sarvādīni sarvanāmāni*); or 2) are subject to the same grammatical

[20] Cf. Goody 1977: 74 ff.

[21] The reference to a *gaṇa* in a sūtra consists in the mention of the first item followed by *ādi* ("etcetera") so the rule itself is not burdened with the complete enumeration of all the members in the set. These lists are collected in the *Gaṇapāṭha*, an ancillary text of the *Aṣṭādhyāyī*.

operation (e.g. the list *sukhādi*, referred to in A.5.2.131, *sukhādibhyaś ca*, containing words that can take the affix *inI*, i.e. -in, as in *sukhin*).

A major example of this device is the list of underived verbal roots (*dhātu*) collected in the *Dhātupāṭha*, one of the ancillary texts of the *Aṣṭādhyāyī*. The whole list, consisting of almost 2000 roots,[22] is referenced in A.1.3.1, *bhūvādayo dhātavaḥ*, a sūtra assigning the technical term *dhātu* ("verbal base") to bhū- etc., namely all the items enumerated in the list, which begins with bhū- "to be". The roots are arranged into ten major subsets according to their "class", namely the way they form their present-system stem through different suffixes (i.e. class markers) commonly called *vikaraṇa* in post-Pāṇinian grammatical literature. Within each class there are further divisions on the basis of different parameters (such as voice, accent, or a combination of these), as well as smaller subsets that are recalled in specific sūtras.[23] In this way, the *Dhātupāṭha* functions as a repository from which, following the leads provided in the body of rules, a user of the grammar can retrieve an item having certain properties that it shares with a number of other items, or on the contrary, one can look up the root of a verb from the object language and find information about its inflection.

The roots themselves are abstractions, in the sense that they are never used as such in ordinary speech, but always undergo some affixation process that makes them viable as fully inflected words. In this respect they are grammatical fictions, the minimal shared theoretical element that can explain the derivation of a set of semantically linked verbal and deverbal forms found in actual use, which can be quite

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[22] S.M. Katre's edition of the the *Aṣṭādhyāyī* contains 1960 roots.

[23] For example, A.7.2.76, *rudādibhyaḥ sārvadhātuke*, refers to a group of five verbs beginning with rud- "to weep" listed together within the second class (the *adādi* class beginning with ad- "to eat"), and prescribes the augment *iṬ* (= i-) before suffixes of the *sārvadhātuka* type (e.g. present-tense *roditi* "he/she/it weeps").

diverse at superficial level.[24] As pointed out by Liebich (1919: 14 ff.) and Palsule (1961: 1 ff.),[25] the idea of a common nucleus – the root – appears already in the Brāhmaṇas, probably as a result of spontaneous, unsystematic observation.[26] But the compilation of a text such as the *Dhātupāṭha* presupposes the collection and collation of thousands of forms for hundreds of verbs, the extraction of a lowest common denominator (the "root"), as it were, for each verb, and the grouping of roots according to formal criteria that are – it is worth reiterating – completely opaque to ordinary speakers of the language. While it is possible with adequate training to memorise the whole text, it is difficult to imagine that a work of this kind could be conceived in an oral culture, or the preparatory work for it be carried out without resorting to writing.

Even though lists such as the *Dhātupāṭha* or the *Gaṇapāṭha* likely began to be compiled before Pāṇini (during the period that I have called the pre-history of Pāṇini's grammar), the two texts attached to the *Aṣṭādhyāyī* are generally admitted to be organically linked to it, so pre-existing versions must have been reworked by Pāṇini for his own purposes. In doing so, he expected the users (readers) of his grammar to manage a complex level of intertextuality that relies on the (relative) stability of the texts. Now, unlike for the Vedic works, such stability was not guaranteed by a well-oiled century-old system of teaching, transmission and

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[24] For example, from vah- "to carry" see the forms *vahati*, 3rd person singular, active present indicative, "x carries"; *uhyate*, 3rd person singular, passive present indicative, "x is carried"; *ūḍha*, passive past participle, "carried").

[25] Palsule offers a tentative historical reconstruction of the various steps leading to the discovery of the concept of root in the pre-Pāṇinian grammatical speculation, which partly relies on Liebich (on the same topic, see also Scharfe 2009: 120).

[26] See Scharfe (2009: 120): "… it was only a small step in the *Aitareya Brāhmaṇa* to use *madvat* … to refer to stanzas [in the Saṃhitā] with various verbal forms such as *mādayantām* and *mādhayadhvam*, in fact recognizing an abstract 'root' *mad*".

recitation, as these were newly-produced humanly-authored texts that were not invested with special religious and cultural clout. The possibility of circulating these interrelated texts and establishing them as authoritative in their field – the grammar of Sanskrit in its entirety, itself a ground-breaking innovation in Brahmanical culture, as I argue below – had to rely on their independent existence as written texts, since there was no community yet dedicated to their preservation and transmission.

Tables

Besides lists, in Pāṇini's grammar we also find another kind of formulation that points to an underlying tabular arrangement of items. Needless to say, tables, with their arrangement of elements in rows and columns, presuppose a notation system and, even more than lists, they are far removed from the unidirectional sequence of speech. The two striking examples of "tabular" formulations I have in mind here are the sūtras A.3.4.78 and A.4.1.2, providing the basic conjugational and declensional suffixes (i.e. finite verbal endings and case endings) respectively.

Being a derivational grammar, the *Aṣṭādhyāyī* does not have proper paradigms (i.e. tables showing the full conjugation of verbs or inflection of nouns). Instead, A.3.4.78, *tiptasjhisipthasthamibvasmastātāṃjhathāsāthāṃdhvamiḍvahimahiṅ*, enumerates all the 18 basic finite verb endings (9 for the three persons, in the three numbers – singular, dual, and plural –, in the *parasmaipada* voice; and 9 for the same in the *ātmanepada* voice[27]) that are introduced to replace the abstract suffix L.[28] Many

[27] The terms *parasmaipada* and *ātmanepada* roughly correspond to active and middle voice (the latter set of endings being used also for passive forms).

[28] An abstract suffix L is introduced after verbs to denote an agent or an object, or, with intransitive verbs in given derivations, the mere action (A.3.4.69). See Cardona 1997: 148.

of these are themselves subject to substitution[29] under appropriate semantic and formal conditions. Similarly, A.4.1.2, *svaujasamauṭchaṣṭābhyāmbhisṅebhyāmbhyasṅasibhyāmbhyasṅasosāmṅyossup*, enumerates the case endings for the seven cases in the three numbers, again to be

[29] For the Pāṇinian method of substitution, by which an original item (whether phonological or morphological) is replaced by another under given conditions, see Cardona 1997: 10. I consider its significance for the present discussion in greater detail below.

substituted where appropriate (i.e. depending on the final sound of the stem) with a different ending. Here are the two sūtras in tabular format:

	Singular	**Dual**	**Plural**
3rd person (prathama) P.	ti**P**	tas	jhi
2nd person (madhyama) P.	si**P**	thas	tha
1st person (uttama) P.	mi**P**	vas	mas
3rd person (prathama) Ā.	ta	ātām	jha
2nd person (madhyama) Ā.	thās	āthām	dhvam
1st person (uttama) Ā.	i**Ṭ**	vahi	mahi**Ṅ**

Table 1. Finite verb endings (*Aṣṭādhyāyī* 3.4.78)

	Singular	**Dual**	**Plural**
prathamā (nominative)	s**U**	au	**J**as
dvitīyā (accusative)	am	au**Ṭ**	**Ś**as
tṛtīyā (instrumental)	**Ṭ**ā	bhyam	bhis
caturthī (dative)	**Ṅ**e	bhyam	bhyas
pañcamī (ablative)	**Ṅ**as**I**	bhyam	bhyas
ṣaṣṭhī (genitive)	**Ṅ**as	os	ām
saptamī (locative)	**Ṇ**i	os	su**P**

Table 2. Case endings (*Aṣṭādhyāyī* 4.1.2)

The hypothesis that a spatial configuration of this kind underlies the formulation of these sūtras is corroborated by the following rules, which assist in their interpretation and correct application:

1.4.99 *laḥ parasmaipadam*;

1.4.100 *taṅānau ātmanepadam*;

1.4.101 *tiṅas trīṇi trīṇi prathamamadhyamottamāḥ*;

1.4.102 *tāny ekavacanadvivacanabahuvacanāni ekaśaḥ*;

1.4.103 *supaḥ*.

The first rule assigns the technical term *parasmaipada* to the substitutes of L, that is, all the verbal endings in the first table, except those starting with *ta* and ending with *mahiṄ* (denoted by the abbreviation *taṄ*), which are called *ātmanepada* according to

the following rule.[30] A.1.4.101 teaches that the technical terms *prathama*, *madhyama*, and *uttama*[31] apply in this order to each member of the two sets (*parasmaipada* and *ātmanepada*) consisting of three triplets of finite verb endings (*tiṄ* in Pāṇini's terminology) in A.3.4.78. The second rule assigns the technical terms *ekavacana* "singular", *dvivacana* "dual", and *bahuvacana* "plural", in this order, to the members of each triplet of verbal endings taken one by one. The third rule prescribes the same terms (singular, dual, plural) for the members of each triplet of case endings (*sUP* in in Pāṇini's terminology) taken one by one. Thus, A.1.4.101-103 effectively instruct users of the grammar how to scan each table, retrieving the relevant grammatical information (e.g. voice, person, number) for each item.[32]

Substitution (*ādeśa*)

The significance of the tabular arrangement of finite verbal and case endings is further evidenced by the key role substitution (*ādeśa*[33]) plays in Pāṇini's system. In this system the main and most basic grammatical operation is affixation, by means of which nominal and verbal bases can ultimately be turned into inflected nouns and verbs as found in ordinary speech. For example, *ṛtvije*, the dative singular of the noun

[30] The second member in the dvandva compound *taṅānau* is -āna, one of the two present participle suffixes, to which the rule also assigns the same technical term. The further import of this sūtra is beyond the scope of this article.

[31] Literally, "first, middle, and last", corresponding to third, second, and first persons in Western grammatical terminology.

[32] Note that the triplets of case endings are not designated by a name hinting at their supposedly principal semantic function (nominative, etc.) as in Western terminology, but simply by an ordinal adjective referring to their position in the sequence, another likely clue to the underlying tabular arrangement.

[33] Acharya (2017) has convincingly argued that the basic meaning of *ādeśa* (in the Upaniṣads as well as in the *Aṣṭādhyāyī*) is simply "indication" (i.e. instruction). Nonetheless, "substitution" is a useful descriptive term for the procedure followed by Pāṇini and discussed here.

ṛtvij "priest" (e.g. in the sentence *ṛtvije gāṃ dadāti* "he gives a cow to the priest") is derived from following the initial string:

ṛtvij + *Ṅe*

Here *Ṅe* (= -e) is the basic case ending of the dative singular according to A.4.1.2 (see Fig. 2 above). Now, if we take another word for "priest", e.g. *yājaka*, with a stem ending in short /a/, the dative will be *yājakāya*. In order to get the correct ending, here the Pāṇinian procedure entails a two-step process. First, the basic ending *Ṅe* is introduced, in this case, to express the recipient:

yājaka + *Ṅe*

However, the rule A.7.1.13 *ṅer yaḥ*,[34] prescribes the substitute element *ya* in the place of (Ṅ)e after a nominal base ending in /a/:

yājaka + *ya* > *yājakāya*.

Effectively, A.7.1.13 teaches that under the specified conditions the element in the slot of the dative singular in the table of case endings in Fig. 2 should be replaced with a different element having the same semantic-syntactic value. Similarly, A.7.1.9 *ato bhisa ais* prescribes the substitute element *ais* in the place of *bhis* (the

[34] Note that in Pāṇini's metalanguage, the substitute element is generally indicated by the nominative (here, *yaḥ*), while the substituend is in the genitive (here, *ṅeḥ*, by A.1.1.49, for which see below), so the rule effectively means: *ya* (in the place) of *e*. The formal condition "after a stem ending in /a/" is continued here from a previous sūtra (A.7.1.9 *ato bhisa ais*), where *ataḥ* is the ablative singular of *aT*, a Pāṇinian shorthand expression equivalent to *adanta*, "ending in /a/", where the ablative is used metalinguistically to indicate the "left" context of an operation (*x*+ablative = after *x*). Another rule (A.7.3.102 *supi ca*) teaches the substitution of a long vowel for the final /a/ of a stem before an ending beginning with certain sounds including /y/. Having a narrower scope, A.7.1.13 prevails over the general rule (*utsarga*) that teaches *Ṅe* in order to express the recipient (*saṃpradāna*) of an action.

instrumental plural ending) after a nominal base ending in /a/, so that one derives *ṛtvigbhiḥ* (by the general rule) vs. *yājakaiḥ* (by the special rule).

The same procedure applies to the variations of sounds within a verbal or nominal base, or to sandhis. For example, A.7.3.84 *sārvadhātukārdhadhātukayoḥ* is a very general rule prescribing that a *guṇa* vowel (i.e. a, e, o) replaces the final vowel of a verbal stem before post-verbal suffixes. Thus, the derivation of the 3rd person singular present *parasmaipada* form of the root ji- "to win" takes two steps (leaving aside a number of finer points that are not relevant here). The first is:

ji + ŚaP + tiP > je-a-ti (by A.7.3.84)[35]

Then, since Sanskrit phonology does not allow a sequence of vowels (such as e-a), another rule, A.6.1.78, *eco 'yavāyāvaḥ*, prescribes the substitution of *ay* for /e/, leading to *jayati*, the final form.

The vocabulary employed in the rules dealing with substitution suggests that this concept developed in a literate milieu. The *Aṣṭādhyāyī* gives no definition of *ādeśa*, but the term is used in one of the three rules that regulate its operation. The first is A.1.1.49 *ṣaṣṭhī sthāneyogā*, a metarule (*paribhāṣā*) specifying that the genitive is used in the grammar to indicate the item undergoing substitution. Thus, the genitive stands for a relation (*yoga*) defined as "in the place of" (*tasya sthāne tat* = x in the place of y), rather than a generic relation. The term *sthāna* "place", which recurs in the related sūtras A.1.1.50 *sthāne 'ntaratamaḥ* and A.1.1.56 *sthānivad ādeśo 'nalvidhau*,[36] clearly points to a graphic representation of words where the position initially occupied by a certain item (according to a general rule of broader scope) is

[35] *ŚaP* is the present stem marker of the first verbal class, *tiP* the 3rd person ending.

[36] The former sūtra teaches that the substitute should be the closest (*antaratama*) to the original element in place; the latter states that the enjoined substitute (*ādeśa*) is treated like the substituend (Sanskrit *sthānin*, lit. the "place-holder").

taken instead by another functionally equivalent item (according to a rule of narrower scope) in a two-step procedure:

B + Sy (ex: yājaka + e)	all bases take the dative singular ending /e/
B + Sx (ex: yājaka + ya)	bases ending in /a/ substitute ya for /e/

B = base; S = suffix

It is very hard to imagine how this kind of combinatory procedure could have developed in a purely oral context, especially the first step entailing the generalised application of a "basic" suffix (to be replaced under specified conditions in the second step), which goes against the speakers' intuitive grasp – the *Sprachgefühl* – of what is linguistically correct: * *yājakai* would simply sound wrong!

However, if Pāṇini and his predecessors had recourse to writing, as I maintain, one can easily picture them coming up with the idea of substitution: first they contrasted written pairs such as *ṛtvije* and *yājakāya*, as may be used interchangeably or jointly (i.e. in coordination) in a sentence; then they noticed the higher frequency of the dative singular ending /e/ across declensions (e.g. *agnaye, gurave, kartre, marute, rājñe, manase*, etc.) than of the ending *ya* (confined to stems ending in /a/); and from there, prompted by a concern for symmetry and generality, they elaborated a theoretical model in which /e/ (*Ṅe*) applied across the spectrum (thus securing a place in the "tabular" sūtra A.4.1.2) only to be replaced where necessary by *ya*. This hypothetical scenario is corroborated, I think, by the remarkable fact that some of the "basic" (i.e. generalised) suffixes are pure abstractions, to be replaced in all cases by "real" ones. See e.g. the suffix L, mentioned above (n. 37), or the set of suffixes

containing the segment *vu* (such as ḌvuN, ṆvuC, ṆvuL, etc.), a cover term for -aka (by A.7.1.1 *yuvor anākau*), as in yaj + *ṆvuL* > *yājaka*.

Going back to *sthāna* (and the related noun *sthānin*), even admitting that words such as *ṛtvije* and *yājakāya* had been analysed and split into base(s) and affix(es) before writing was introduced, the intrinsically ephemeral nature of speech production makes it unlikely that one would talk about the occurrence of the suffix after the base and its eventual substitution with terms like *sthāna*/*sthānin*. Their inescapable spatial connotation evokes an idea of permanence, of stability, that contradicts the human experience of language as fleeting. Talking of the "place" of a suffix seems to presuppose the graphic representation of words, in which their various components literally occupy different portions of space.

It is worth noting that the substitution method represents a Pāṇinian innovation. In Vedic grammatical works, the formulation of rules of sound change relies on a procedure known as *vikāra*, lit. "modification", which assumes that an item (a sound or group of sounds) transforms into another, i.e. becomes something else (see Cardona 1969: 13). This supports the hypothesis that the contrast between the *vikāra* and the *ādeśa* procedures reflects the transition from orality to literacy.

Linguistic zero (*lopa*)

Particularly significant, and relevant to my hypothesis, are those cases where an element in one of the slots in the above tables is replaced by what modern linguistics calls a "zero" suffix. For example, *phalam*, the accusative singular of the neuter word

phala "fruit" (as in *bālaḥ phalam atti* "the boy is eating the fruit") is derived with the addition of the basic suffix -am from the following string:

phala + am_{acc}

If we add the adjective *svādu* "sweet" (as in *bālaḥ svādu phalam atti* "the boy is eating a sweet fruit"), its derivation goes through a double-step process:

1) svādu + am_{acc}

2) svādu + *luK* (= ø) > svādu

The second step is prescribed by A.7.1.23 *svamor napuṃsakāt*, according to which *luK*, one of the names of linguistic zero in the *Aṣṭādhyāyī*, takes the place of *sU* and *am* (the items in the first and second slots of the left column in Table 2) after a neuter (*napuṃsaka*) stem. As is known, zero is a place indicator in a positional number system, and its development is historically linked to the evolution of notation systems. Now, the idea behind Pāṇini's *lopa* (the most general term for the linguistic zero) is that, for example, in the inflection of a noun the slot for a given case may be empty – as in *svādu* (*phalam*) –, namely the form appearing in use may be apparently identical with the stem form, but the ending is still operative on the semantic level. Similarly, in the nominative singular of words such as *devī* "goddess", *marut* "wind", etc., the basic ending *sU* is substituted by a zero suffix. Once again, it is difficult to imagine how this concept (sometimes called "morphological zero") could arise in a primary oral context. The idea that a zero suffix may serve its function without manifesting itself seems to originate from a comparison between written words, where the mute presence of the suffix – the subtle dynamic between its being there and not being there – *visually* stands out (e.g. in a phrase such as *svādu phalam*).

Long ago Goldstücker (1861, p. 60) drew attention to the fact that A.1.1.60, *adarśanaṃ lopaḥ* – the sūtra defining *lopa* (the most general term for the linguistic zero in the *Aṣṭādhyāyī*) – characterises it as the *invisibility* (*adarśana*) of an item

(rather than, say, its non-audibility, *aśravaṇa/aśruti*),[37] which again suggests that this device originated in a literate environment, where the written suffix introduced in the first step of the derivation was no longer there (i.e. not visible) after the second step, but a speech item such as *svādu* in *svādu phalam* was nonetheless viable in ordinary language and fully qualified for the technical term *pada* ("inflected word") from a grammatical point of view. Goldstücker's interpretation is suggestive (and I am inclined to subscribe to it), but it is vulnerable to the obvious criticism that the term *darśana*, although primarily meaning "vision" (i.e. "eyesight"), is commonly used in the general sense of "perception".[38] Therefore, by itself *adarśana* does not necessarily indicate that the idea of linguistic zero (*lopa*) was inspired in Pāṇini (or one of his immediate predecessors) from the contrast between visual (i.e. written) representations of words.

The form (*rūpa*) of words

The visual connotations are even stronger in another term appearing in a sūtra that is a cornerstone of Pāṇini's linguistic theory and descriptive methodology, namely A.1.1.68 *svaṃ rūpaṃ śabdasyāśabdasaṃjñā*. This important rule institutes a metalinguistic terminological convention by which a speech unit (*śabda*) mentioned in the grammar stands for its own form unless it is a technical term (*saṃjñā*), in which case it maintains its ordinary denotative function. In a literate culture, the concept of

[37] A.1.1.61, *pratyayasya lukślulupaḥ*, extends this characterisation (*adarśana*) to *luK*, *Ślu*, and *luP* when the element replaced with zero is a suffix (*pratyaya*).

[38] Perhaps, Goldstücker himself anticipated this objection, as he remarks (1861: 61): "The literal sense of this word [*lopa*] … is "cutting off". It will be conceded that it is not possible to "cut off" any but a visible sign, and that a metaphorical expression of this kind could not have arisen, unless the reality existed. […] For, whatever scope may be given to the figurative meaning of the radical "to see", it is plainly impossible that an author could speak of a thing visible, literally or metaphorically unless it were referable to the sense of sight".

the form of a word – i.e. its particular sequence of sounds – is not difficult to grasp because any word is associated to a certain fixed combination of graphic signs (letters in the case of alphabets or alphasillabaries, as Indian scripts are sometimes called[39]), as can be found in documents, books, and dictionaries.

But how could a primary oral culture even conceive the *form* of a word? Spoken words are fluid, and they cease to exist as soon as they have been uttered. The term *rūpa* has even stronger visual connotations than *sthāna*: it is the shape or appearance of a thing, and in certain contexts it even refers to the sense of sight.[40] Surely, it also takes on the meaning of nature or kind of a thing, but even if it comes to be used and understood in a rather abstract, immaterial sense, this meaning clearly evolves from the simple idea that things can be identified from their shape, their appearance, which is roughly common to all specimens of the same kind. Writing alone can give "form" to words – namely a permanent aspect that is accessible through visual perception instead of hearing. In doing so it effectively allows the form (the signifier) to be emancipated from the meaning (the signified) and liable to be manipulated in various ways (isolated from the context of the utterance, analysed into its components, split, inflected in a paradigm, etc.) without being shackled, as it were, by its connotations. Once writing has been introduced, the form of a word begins living a life of its own, especially in the field of grammar. To a grammarian, it does not matter whether *siṃha*

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[39] See Salomon (1996: 376).

[40] For example, in Vaiśeṣika (see e.g. *Vaiśeṣika Sūtra* 8.17 *tathāpas tejo vāyuś ca rasarūpasparśajñāneṣu rasarūpasparśaviśeṣāt*, where *rūpa* "sight" is listed along *rasa* "taste" and *sparśa* "touch"), or in the Sarvāstivādin-Vaibhāṣika Abhidharma, where *rūpa* is used to designate the specific object of the eye/visual organ/visual faculty (as *śabda* is for *śrotra*, etc.), hence its common translation as "visible thing" (I wish to thank Vincent Eltschinger for the latter reference).

"lion" denotes the animal or is used figuratively to describe a brave man, as long as the declension of *siṃha* is unaffected.

The other relevant[41] occurrences of *rūpa* in the *Aṣṭādhyāyī* seem to confirm the interpretation suggested above. There are four sūtras in which the term is used in the sense of "form" of a speech unit:

A.1.2.64 *sarūpāṇām ekaśeṣa ekavibhaktau*

A.2.2.27 *tatra tenedam iti sarūpe*

A.3.1.94 *vāsarūpo 'striyām*

A.6.1.94 *eṅi pararūpam*

The first sūtra, where *rūpa* appears in the *bahuvrīhi* compound *sarūpa* "having the same form", teaches that of two or more stems that are of identical form only one remains (*ekaśeṣa*) if they are followed by the same case ending. The second allows the formation of a type of idiomatic *bahuvrīhi* in which two words having identical form and ending in the locative or instrumental are combined (i.e. the same word appears twice), as in *keśakeśi yuddham*, "a fight in which the fighters pull each other's hair". According to A.3.1.94, primary suffixes (*kṛt*) that do not share the same form (*asarūpa*) are introduced optionally (*vā*) – namely, they alternate freely – after a verbal base except in the case of feminine suffixes (*astriyām*) used to derive action nouns, for example *vikṣepakaḥ*, *vikṣeptā*, *vikṣipaḥ*, all agent nouns meaning "thrower", derived with the suffixes *ṆvuL*, *tṛC*, and *Ka*, respectively. Finally, A.6.1.94 *eṅi pararūpam* prescribes that a single sound is the substitute of two contiguous ones – one the final /a/ of a preverb (*upasarga*), the other the initial /e/ or

[41] I consider relevant (and discuss below) those sūtras in which the term *rūpa* is part of Pāṇini's metalanguage. However, the word is also mentioned in a few rules as an item of the object language on which a given operation is to be performed (i.e. as an operand). For example, in A.3.1.25 *rūpa* is listed along *pāśa*, *vīṇā*, *śloka*, etc., as a word from which one can derive a denominative verb (*rūpayati*) through the introduction of the affix *ṆiC*.

/o/ of a verb –, and this substitute should have the "form" of the one that comes later (*param*), as in *upelayati* (from *upa+elayati*) or *upoṣati* (*upa+oṣati*). Interestingly, as this brief survey of the relevant rules shows, the speech unit that has a "form" can be anything from a fully inflected word to a stem, a suffix, or even a single phoneme.

Tag letters (*anubandha*)

As the above discussion shows, one striking feature of Pāṇini's grammar is its elaborate metalanguage. While often employing terminology that appears to have been inherited from his predecessors – in particular, the so-called *mahatī saṃjñā*s (the etymologically transparent terms) –, Pāṇini (probably continuing in the wake of his immediate predecessors) also makes systematic use of artificial elements such as tag letters or markers (*anubandha*), frequently in positions or combinations that violate the phonological rules of the object language (see e.g. the abbreviation *aC* "vowel", or the affix *Ṇvu*L = -aka, etc.). Once again, this device seems to be an innovation with regard to Vedic grammatical literature, so it begs the question of which factors may have contributed to its appearance.

As is known, *anubandha* – literally "that which is tied behind" (*anu paścād badhyata iti*) – is the name traditionally given to a sound (or a group of sounds) that is appended to a stem, suffix, or root to indicate the occurrence (or non-occurrence) of certain grammatical operations such as substitution by *guṇa* or *vṛddhi*, accentuation, etc., that apply to the element carrying it.[42] The term *anubandha* is used by the whole grammatical tradition starting from Kātyāyana, but Pāṇini himself calls this device *it* in A.1.3.2 *upadeśe 'j anunāsika it*. In this sūtra, and the following six,

[42] For example, Palsule (1961: 59) explains that one of the purposes of the *dhātupāṭha* is to provide information on the roots, "thanks mostly to the ingenious grouping of roots, and to the wonderful system of the Anubandhas (code letters)".

he teaches how to recognise the sounds that are to be regarded as tag letters *within* the grammar (*upadeśe*, lit. "in the teaching"), clearly identifying it as a metalinguistic feature: among these, nasalised vowels, certain final consonants, etc.[43] The sequence is closed by A.1.3.9 *tasya lopaḥ*, prescribing their unconditional deletion (*lopa*) at the outset of a derivation.[44] While no explanation is offered in the *Aṣṭādhyāyī* about the general functioning of *anubandha*s (again suggesting that the device had already gained some currency in Pāṇini's time), the purpose of individual tags is taught (or is inferrable) from specific sūtras. For example, A.1.1.5 *kṅiti ca* prescribes that, when a verbal base (*dhātu*) is followed by suffixes tagged with /k/ or /ṅ/ (*k-ṅ-it* is a *bahuvrīhi* of a type that is common throughout the *Aṣṭādhyāyī*, meaning "that which has /k/ or /ṅ/ as an *it*, i.e. a tag).

Moreover, the tag letters at the end of each *Śivasūtra*, as well as those appended to some of the basic nominal and verbal affixes mentioned above (see Tables 1-2), are used to form abbreviations (*pratyāhāra*),[45] which are common throughout the grammar. Thus, *aC* means "vowel" because /a/ is the first vowel in the list of sounds in the *Śivasūtra*s and /c/ is the tag appended to the sūtra *ai au c* that completes the vowel set; *haL* means "consonant" because /h/ is the first consonant in *Śivasūtra* 5, *ha ya va ra ṭ*, and the consonant set is closed by sūtra 14, *ha l*;[46] and *tiṄ* means "finite

[43] For a detailed treatment of *anubandha*s, see the monograph by Devasthali (1967).

[44] According to a traditional interpretation first found in the *Cāndravṛtti*, the term *it* – understood as an agent noun from the root i- "to go" – refers to this: *gacchati, na tiṣṭhati, lupyata ity arthaḥ* "it goes, it does not stay, namely it is deleted" (see Palsule, 1961: 62, n. 5).

[45] A.1.1.71 *ādir antyena sahetā* teaches that the initial (*ādi*) element of an orderly set joined with the tag letter (*it*) attached to the final (*antya*) element creates an abbreviation used as a technical name for each of the members of the set.

[46] For the repetition of /h/ see Cardona 1969: 36.

verb ending" because the list (see Table 1 above) begins with *tiP* (= ti) and ends with *mahiṄ* (= mahi).

I think the idea of tags is much more likely to have arisen in a literate culture than in an oral one. One can easily imagine, for instance, how the early literate grammarians tentatively identified a set of basic case endings through the method known as *anvaya-vyatireka*, then abstracted and separated them from nominal bases, and noted them down *without tags* in a prototype of Table 1 above. But then, the homophony of several of these endings (e.g. a segment *as* denotes at the same time the nominative plural, accusative plural, ablative singular and genitive singular) may have prompted the grammarians to seek a way to distinguish them from one another in the metalanguage. Perhaps they first used graphical devices, i.e. abstract symbols, and then, in order to be able to refer to these endings, indeed *to talk* about them, the idea to mark them with letters arose.[47] Another prominent function of *anubandha*s in Pāṇini's grammar is in fact to distinguish homonyms (*viśeṣaṇārtha*). The four case endings mentioned above are thus called Jas, Śas, ṄasI and Ṅas, respectively, but the letters J and Ś of the first two serve the sole purpose of identifying them (see Devasthali 1967: 104). From this stage, the next step – associating certain tag letters to specific grammatical properties and operations – appears quite natural. And tagging with sounds in positions or combinations that are non-natural in Sanskrit – e.g. word-initial Ṅ (*ṄasI* and *Ṅas*), word-final C (*aC*), *CvI* (A.5.4.50), *Ṇvul*, etc. – seems much more likely to have initially developed as a graphic device, the visual impact of which was surely all the more powerful as it went against the phonological

[47] I am not maintaining that this is exactly how *anubandha*s came into existence, but simply suggesting one plausible hypothetical scenario for their creation and development.

rules of the object language, rather than as a vocal one.[48] Once created and established, of course, these sophisticated, artificial metalinguistic terms – like any technical nomenclature – could be memorised, discussed and taught orally. As the terms became established in the grammarians' practice, even the most unusual combinations of sounds could be pronounced and recognised by the hearers. I doubt, though, that they could be invented as primarily vocal devices. The evidential force of each of the features discussed in this paragraph, taken individually, may appear insufficient to prove Pāṇini's reliance on writing, but I think their cumulative weight is hard to ignore.

6 Pāṇini's grammar as an epistemic rupture in Brahmanical culture

Admittedly, there are many uncertainties in the reconstruction of the origins of Pāṇini's grammar that I have proposed above. Several aspects of the structure and terminology of the *Aṣṭādhyāyī* need to be carefully reconsidered in light of my hypothesis that the introduction of writing played a crucial role in the making of an innovative intellectual approach to the study and description of the Sanskrit language.

However, I think it is not a mere coincidence that Pāṇini's work stands at the beginning of a wholly new phase in Brahmanical culture, with far-reaching and long-lasting consequences. For the first time (as far as we can tell), the object of systematic intellectual inquiry was no longer one set of texts belonging to the Vedic corpus or some aspect of the system of ritual knowledge that had been erected around them, as was the case with the systems of knowledge called Vedāṅgas, but rather a worldly (*laukika*) phenomenon, at the same time natural and social in nature, namely the

[48] Interestingly, in secondary literature most authors use some graphic expedient to make *anubandha*s stand out: capital letters (as I do here), bold font (e.g. Cardona 1997), or superscripts (e.g. Scharfe 1971).

language *spontaneously* used in – at least some contexts of – everyday communication.[49] The secularisation of knowledge opened the doors to all sorts of new forms and areas of systematic intellectual inquiry, providing a general template for rational formal discourse. In this respect Pāṇini's oeuvre marked a veritable epistemic rupture in the intellectual history of Brahmanism (and generally of ancient India), liberating it from the concerns and strictures of Vedism.[50]

It would be difficult to overestimate the impact of the emancipation of speculative thought from immediate religious concerns that is epitomised by Pāṇini's *Aṣṭādhyāyī*. For the first time the legitimation of intellectual labour was no longer derived from the sanctity of its object but by its own capacity to account in an exhaustive and satisfactory way for the complex phenomenon it set out to describe. From this perspective Pāṇini's enterprise can be said to be entirely secular to the extent it is self-validating. Grammar effectively ceases to be a *vedāṅga*, an auxiliary of Vedic learning, and asserts itself as an independent system of knowledge divorced from preoccupations such as the preservation and interpretation of the sacred texts, or the correct performance of ritual.

In this regard, it appears that Pāṇini's grammar, as the first mature product of the new ideological mindset fostered by literacy, paved the way for all sorts of new developments in the Brahmanical world. Discussing the historical context of Kauṭilya's *Arthaśāstra*, the earliest known work on statecraft, McClish and Olivelle (2012: x) note that the period around the beginning of the Common Era saw "the evolution of a shared South Asian culture" for which "of great importance … was the

[49] It is a moot point to what extent the language described by Pāṇini can be called a "living", "natural" language. As is known, this issue has been the object of a heated debate throughout the history of Indology. I will deal with it in greater detail in the final paragraph.

[50] Cf. Renou (1956: 63): "Pāṇini marque un affranchissement par rapport au domaine védique, lequel se limitait à un petit nombre de genres littéraires."

development of elite intellectual traditions of inquiry into various topics and their systematization into a complete taxonomy of human knowledge". I cannot elaborate on this point here, but it is worth noting that, like the *Arthaśāstra*, other works from around the beginning of the Common Era are refined examples of their own genres, for instance the oldest Āyurvedic treatises, the early Dharmaśāstra texts, and the *Nāṭyaśāstra*. This suggests a sufficient long pre-history that allowed certain spheres of discourse to emerge, mature and develop their own discursive and stylistic conventions, modes of argumentation, and specialised vocabularies. What they share with Pāṇini's grammar is that they transcend the narrow horizons of particular Vedic traditions to ideally address a much wider audience, the community of Sanskrit users at large,[51] which soon came to include some sections of the Indian Buddhist community (and later all of it).[52]

Pāṇini's earliest known commentators, Kātyāyana and Patañjali (generally dated to the 3rd and 2nd centuries BCE, respectively) seem to manifest a shift of attitude. They appear to be caught in an insoluble contradiction: on the one hand they continue in the footsteps of the founder of the tradition, and vigorously contribute to the edification of a new intellectual culture; on the other, especially in the introductory section of the *Mahābhāṣya*, the *Paspaśāhnika*, they articulate a traditionalist apologetics of the "new" grammar from the vantage point of Vedic Brahmanism – too late, because the new symbolic order heralded by the *Aṣṭādhyāyī* (and signalled by other cultural and social phenomena in the centuries around the beginning of the Common Era) had already set in. Commenting on the *vārttika*

[51] In this respect see Agrawala (1953: 350): "This attitude towards the reality of life resulted in the secularization of knowledge and is patent in the A[ṣṭādhyāyī] which for the most part served the *Bhāṣā* or the spoken language of Pāṇini's time and was not tied to the chariot-wheels of Vedic schools".

[52] For a recent reappraisal of the complex factors that led some Buddhists to adopt Sanskrit (possibly as early as the 1st century CE), see Eltschinger 2017.

rakṣohāgamalaghvasaṃdehāḥ prayojanam,[53] Patañjali strives to justify the relevance of Pāṇini's grammar for strictly Vedic purposes (such as the preservation of sacred texts, the adaptation of ritual formulas to different contexts, etc.), but centuries later the Mīmāṃsaka Kumārila resolutely confutes his arguments dismissing the usefulness of grammar from a strictly orthodox Vedic perspective.[54]

Some clues point, I think, to the novelty Pāṇini's *Aṣṭādhyāyī* must have represented on the cultural scene of ancient India. He is one of the very first authors in the history of Sanskrit literary culture that has a proper name unique to him (even if it was the name of his *gotra* lineage)[55] rather than a name associated to a school (such as Āpastambha, Baudhāyana, etc.) or to a legendary sage (such as Vasiṣṭha or Manu), and one of the very few (even in medieval times), whose place of birth is known, as mentioned above. A kernel of historical truth seems to have remained attached to his work, a reflection I think of the fact that it indeed heralded a new era.

The geographical location of Pāṇini and his immediate predecessors (the earliest literate Sanskrit grammarians) was probably one of the factors that helped to trigger their enterprise. Around the mid first millennium BCE Gandhāra Brahmans found themselves isolated,[56] as the centre of the Brahmanical civilisation in the previous centuries shifted south-east to the Gangetic plain. This is reflected, shortly after Pāṇini's time, in the earliest known definitions of Āryavarta, the land of Āryas whose "customs… are viewed as normative" (Olivelle 2000: 10), found in virtually identical terms in the *Dharmasūtra* of Baudhāyana and the *Mahābhāṣya*, which leave out this

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[53] *Mahābhāṣya* 1.1.14 (not given as a *vārttika* in Kielhorn edition, but cf. Joshi and Roodbergen 1986: 26).

[54] For a translation of this *Mahābhāṣya* passage and an overview of the Mīmāṃsā critique, see Joshi and Roodbergen 1986: 28-37.

[55] Cf. A.6.4.165 *gāthividathikeśigaṇipaṇinaś ca*.

[56] Deshpande (1983) dubs Pāṇini a "frontier grammarian".

region.[57] Their isolation may have contributed to generating a sense of urgency to record and preserve a language that they felt was threatened by changing socio-political and cultural circumstances – a language Pāṇini and a significant section of his community (certainly Brahmans and perhaps others) strongly identified with, at the core of their Ārya identity. At the same time, far from being a backwater, Gandhāra was a crossroad of cultural influences. Three important trade routes met there, linking it to Gangetic India and all the way to Magadha to the east, as well as to Persia to the west, and Bactria, Kashmir and Central Asia to the north (Dani 1986: 15-16), and archaeological research has shown that Puṣkalāvatī and Taxila developed as urban centres already in the first half of the first millennium BCE (Erdosy 1995; Allchin 1995: 125-133; Petrie and Magee 2012: 514, 520-521).[58]

It is impossible to determine the extent to which Pāṇini, and the grammarians that were his predecessors and contemporaries, were aware of being the agents of such a momentous change. We have virtually no evidence to assess Pāṇini's ideological stance regarding the Vedic worldview, or his awareness of the hugely innovative nature of his creation. I think it likely that, to a large extent, he considered his work as the natural continuation and coronation of the work of generations of Vedic scholars of *vyākaraṇa* as a Vedāṅga. Nonetheless, it is striking that there are not many other works in the history of Sanskrit śāstric literature (both Brahmanical and non-Brahmanical) which, like the *Aṣṭādhyāyī*, contain no reference whatsoever

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[57] See e.g. MBh ad A.2.4.10 (also ad A.6.3.109): *kaḥ punaḥ āryāvartaḥ. prāg ādarśāt pratyak kālakavanāt dakṣiṇena himavantam uttareṇa pāriyātram* "The region to the east of where the Sarasvatī disappears, west of Kālaka forest, south of the Himalayas, and north of Pāriyātra mountains" (tr. Olivelle 2000: 199). The term *ādarśa* refers to the place where the legendary river Sarasvatī (of uncertain identification), which flowed between the Indus and the Ganges, disappeared in the desert region between the Indus and the Ganges-Yamunā basins.

[58] Cf. Bronkhorst's reflections on "urban Brahmins" (2007: 161 ff.).

to an ultra-mundane reality: no initial invocation to a deity, no claim of indicating a road to the supreme good or liberation. Whatever Pāṇini's religious beliefs may have been, he has not made any mention of or even any allusion to them.

7 The nature of Pāṇini's Sanskrit

The picture I have outlined above, suggesting that the *Aṣṭādhyāyī* marked a crucial turn in the intellectual history of ancient India, rests on the assumption that Pāṇini conceived of Sanskrit – the object language of his grammar – as an everyday language, neither confined to particular contexts nor, in principle, to a particular social class. This transpires quite clearly, I believe, from many of his rules, as I will show below. However, it is difficult to assess with any certainty to what extent this corresponded to the linguistic reality of the society of his time. There is no explicit statement to that effect in contemporary works, and the clues we can glean from the surviving texts (surely, only a fraction of those that must have existed at any given time) are often hard to reconcile with one another. The best we can do is to come up with a reasonably convincing but inevitably tentative reconstruction, keeping in mind that new evidence might force us to reconsider it to a substantial degree.

The nature of the language described by Pāṇini has been the object of an intense debate throughout the history of modern Indology. Many prominent scholars have argued that Pāṇini's Sanskrit was a living language, which in his time had a colloquial, informal dimension alongside a cultivated, literary one (see, among others, Rapson 1904; Keith 1928: 8-17; Renou 1956: 62 ff.). Others, on the contrary, have claimed – with different arguments and more or less categorically – that the language described by Pāṇini was exclusively (or mainly) a literary, cultivated language, at a time when various middle Indo-Aryans dialects, the so-called Prakrits, were actually spoken across north India. A survey of the various positions (and the

related arguments) in the debate would certainly be interesting, but it is beyond the scope of this article. Here, I will confine myself to a presentation of my current understanding of the issue under discussion.

Once again, I think we need to tackle the question starting from our principal piece of evidence, the *Aṣṭādhyāyī* itself. We can reasonably assume that (like grammars do even today) it describes what Pāṇini considered the standard variety of the language, which, like any other language in the world, must have had regional and social varieties and registers. The ideal (and possibly somewhat "idealised") speaker he had in mind was most probably a male Brahman of his region, the Indian north-west that had a reputation for being the homeland of the good language[59] – in other words, someone very much like himself. He clearly identifies two of the dimensions of this standard language, that must have been part of the linguistic repertoire of his ideal speaker: *chandas*, the language of the Vedic texts that an educated Brahman male was expected to study from his late childhood to his early adulthood, and – at the opposite end of this variegated spectrum – *bhāṣā*, literally just "speech", surely a colloquial variety. Both are treated as somewhat marginal, as deviations from a norm that is treated in the great majority of the unmarked rules of his grammar.[60] That this common standard language was also an ordinary language of communication is suggested by the distinction made by Pāṇini's earliest known commentator, Kātyāyana (possibly, 2nd c. BCE), who in the first *vārttika* states that grammar is concerned with both *vaidika* and *laukika* (worldly) usage. If we take the

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[59] See the well-known passage from *Kauṣītaki Brāhmaṇa*, 7.6: *tasmād udīcyāṃ diśi prajñātatarā vāg udyata udañ ca u eva yanti vācaṃ śikṣituṃ yo vā tata āgacchati tasya vā śuśrūṣante* "In the northern region, speech is spoken particularly distinct. So, people go to the north to learn speech. Or, if someone comes from there, they like to hear (learn) from him" (quoted and translated in Thieme 1935: 80).

[60] See Deshpande 1993: 67-72. Deshpande has devoted several important publications to the sociolinguistics of Sanskrit (among others, Deshpande 1979).

grammarians seriously, as I think we should, we have to admit that Pāṇini's Sanskrit was not just the literary language of the sacred texts,[61] and the strictly regimented idiom of the carefully scripted ritual sphere (*vaidika*),[62] but also a medium of ordinary communication (*laukika*).[63]

Several features of Pāṇini's work show, in fact, that this communication was not restricted to specific contexts and topics. First, there is the conspicuous evidence provided by the vocabulary incorporated in his grammar. It is hard to imagine that its richness and variety is functional to a communication exclusively restricted to ritualistic or didactic contexts.[64] Even more than the lexicon, I consider especially significant the subtlety of many of Pāṇini's semantic and pragmatic annotations, such as the numerous rules in which the derivation is affected by the emotional state and disposition of the speaker, described by Pāṇini with terms like *anukampā* "sympathy", *prahāsa* "irony", *abhipūjita* "praise", *kopa* "anger", *kṣepa* "criticism", *kutsana* "scorn", *krośa* "insult", *bhartsana* "menace", *ābādha* "distress", etc. And

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[61] In fact, Pāṇini's treatment of Vedic is limited and far from systematic. On this point, Renou (1956: 65-66) notes: "P[āṇini] sépare avec soin de son exposé général environ 250 sūtra dont la validité est limitée au Veda: ce n'est pas un traitement exhaustif de la langue des Hymnes, ce sont des notations isolées, établies en fonction de l'usage ultérieur et qui marquent pour ainsi dire la frontière par rapport à ce dernier".

[62] In one of the latest and most radical reiterations of this view, Pollock (2006: 67) claims that "everything we know or can infer about the nature of Sanskrit culture *for the entire first millennium* BCE" (my emphasis) shows "the prevalence of its liturgical dimension, the forms of knowledge necessary for liturgy, and the restriction of its use to those alone who participated in this form of life", "a steady state of literary-cultural convention that was exploded in the early centuries of the first millennium". I cannot directly engage with Pollock's views here, but this article clearly advances an interpretation of the early history of Sanskrit that is alternative to his.

[63] Renou (1956: 82) notes in fact that the term *loka*/*laukika* "excludes the scholastic acceptation altogether" ("exclut tout à fait l'acception livresque").

[64] For appropriate examples, see Keith 1928: 17-18; Agrawala 1953, in particular pp. 350 ff.; Renou 1956: 67.

there are even rules dealing with the intonation to be used in greetings under different social circumstances.

Sometimes Pāṇini seems content with leaving his formulations open or blurred in the margins, which may be an implicit recognition that certain linguistic devices – such as the use of some secondary (*taddhita*) suffixes - were productive and therefore able to expand in unexpected directions. And, as Renou observes, "there is no want of rules for which the literature of later periods, even in its more erudite inventions, has no examples to offer".[65] Unless, *à la* Whitney,[66] we suspect Pāṇini to have made up the idioms he describes, this too suggests a living language in a state of flux (like any language at any time), some of whose usages, perhaps very particular to Pāṇini's region and community, did not pass into later, "classical" Sanskrit.

Was this the language he spoke at home, to relatives and servants? The language of the market-place? Probably not, although we cannot be absolutely certain. It is not impossible that the Brahmans of Gandhāra (or even the broader local Ārya community) were linguistically conservative, so that their everyday language would have been less distant from standard Sanskrit than that of other areas of north India. (There are several examples in history of communities using and thus preserving an "archaic" language that is key to their ethnic and/or cultural identity.)

It is also possible, however, and perhaps more likely, that his domestic language was a more markedly regional – "Prakritic" – variety, a precursor of the Gāndhārī attested a few century later in Buddhist manuscripts from the area; and that Pāṇini and contemporary Brahmans, but possibly other social groups as well, used more standard (more Pāṇinian!) varieties of the same speech according to the

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[65] "[I]l ne manque pas de règles pour lesquelles la littérature des âges postérieurs, même en ses plus érudites inventions, n'a pas d'exemples à présenter" (Renou 1956: 67).

[66] Cf. e.g. Whitney 1884, reprint in Staal 1972.

circumstances. We can plausibly imagine them mastering a linguistic range going from the cultivated, formal, conservative Sanskrit employed in rites, Vedic didactic contexts and learned debates, to gradually more dialectal, informal, colloquial varieties.

Moving away from the north-west, the cradle of the oldest Vedas and home of the "good language", the linguistic distance of the local varieties from Pāṇini's Sanskrit certainly varied to a considerable degree, and each of them must have been internally diversified. I think it reasonable to assume (at least as a working hypothesis) that within this quite diverse linguistic and cultural horizon, which in the late first millennium BCE covered most of north India and kept expanding east and south, Sanskrit played the role of "high" variety across the area, but it also functioned as a kind of lingua franca. As the language of Vedic religion and learning, it carried the prestige of these associations and was "the major vehicle of learned discourse and ritual in use among members of a community … that constituted a linguistic and social elite, … with vernaculars used in less formal circumstances and by other speakers" (Cardona 1997: 2). But I would suggest that it was equally employed as the shared medium of verbal communication on more mundane topics among elite speakers from different linguistic backgrounds. In other words, I think it may have had a colloquial dimension (Renou calls it an *Umgangsprache*), which allowed it to be used in a wide range of contexts and, probably, by a larger segment of the population than just the Brahmans.

Under these circumstances, it would not be surprising if the prestige attached to the north-western speech (even before Pāṇini) induced phenomena of emulation, so that a transregional standard modelled after that regional variety emerged and propagated through spontaneous mechanisms of social pressure to imitation and conformity. This standard may have in turn favoured the shaping of a collective

cultural identity, founded on Vedism but transcending it because no longer tied to the old symbolic order centred on village ritualism and linked to a pastoral economy. It is the idiom of this new, already incipiently cosmopolitan, order that Pāṇini codifies in his work, relying on the newly introduced technology of writing, and by his effort he creates Sanskrit, as it were, the perfect language forever immune to change.

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