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## On the Octaval System of Reckoning in India

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## On the Octaval System of Reckoning in India

MAN, we are told in the *Chāndōgya-upaniṣad* (vi. 7. I), is made up of sixteen parts. Those parts are given in the *Satapatha-brāhmaṇa* (x. 4. I. 17) as *lōman*, 'hair', *tvac*, i.e., *tu-ac*, 'skin', *asṛj*, 'blood', *mēdas*, 'fat', *māmsa*, 'flesh', *snāvan*, 'sinew', *asthi*, 'bone', *majjan*, 'marrow', the sixteen parts (*kalā*) being represented by sixteen syllables (*akṣara*). Nor is this by any means the only instance in which Indian lore has found some difficulty or uncertainty in filling in the details of such groups of sixteen or multiples of sixteen, though I imagine it would not be easy to discover another that called forth quite so much complacent ingenuity as is here exhibited. In the case of the sixteen-fold division of ancient India which prevails in Buddhist literature<sup>1</sup> there was no great difficulty in discovering the requisite number of suitable geographical names. But who would venture to draw up a definitive list of the sixty-four arts,<sup>2</sup> or who—to descend to matters of less moment—would name to-day with absolute certainty all the constituents of the *śoḷah singār*, 'the sixteen ornaments of the body (or appliances for decoration).'<sup>3</sup> A similar indefiniteness attaches to the numeral in *śoḍaśamsu*, or *śoḍaśārcis*, 'of sixteen rays', as a name for the planet Venus, and probably—at least in the first instance—to such groups as the eight lucky things (*aṣṭa-maṅgalam*), and the sixteen modes of doing homage to a deity (*śoḍaśopacārāḥ*), or even the thirty-two kinds of arsenic.

There can be little doubt that, in such instances as these, it was never intended that the numbers should be taken literally. We have to do, rather, with generalized expressions, with 'round numbers', used much in the same way as 'dozen' or 'score' may be used in English to-day, or as 'forty' was so frequently used in the time of Shakespeare.<sup>4</sup> At the same time it seems fairly clear that such generalizations imply the existence at an early period of a system of reckoning in which the number sixteen figured prominently: and, as a matter of fact, numerous instances of such a system—or at least of such a remarkable predilection for this and related numbers in unmistakably real groups and especially in connection with weights and measures as can hardly be otherwise interpreted—meet us, not only in Indian literature, but in every part of India at the present day. Amongst these related numbers the number eight, the half of sixteen,

<sup>1</sup> Rhys Davids, *Buddhist India*, p. 63.

<sup>2</sup> Ancient lists are brought together by A. Venkatasubbiah in his inaugural dissertation (Bern), *The Kalas* (Vasanta Press, Madras, 1911).

<sup>3</sup> Platts, *A Dictionary of Urdū, Classical Hindī and English*, s. v. *singār*: the very connotation of the word seems to be uncertain.

<sup>4</sup> For example, *King Richard II*, iii. 2. 85 ('Is not the king's name forty thousand names?'); *Coriolanus*, iii. 1. 243; *King Henry V*, iv. 4. 12; *Merry Wives of Windsor*, i. 1. 179,



holds an important position and may, indeed, be regarded as the base of the whole series, and originally, as I suggest, probably was the base.

The division of the rupee into sixteen parts will occur to every one, and the seer employed as a weight over almost as large an area, is of course similarly divided. Sixteen *māṣas* (a kind of bean used for weighing gold and jewels) in ancient times made one *karṣa*: in modern times this is the weight of a sicca rupee, a tola; and one *māṣa* is said to be equal to eight (or ten) *rattīs* (the seed of the plant *Abrus precatorius*); and so on. In Buddhist literature we hear of royal gifts consisting of sixty-four objects, eight groups of eight objects each (eight elephants, eight horses, eight men-slaves, eight women-slaves, etc.)<sup>1</sup> In Sanskrit we have the Aṣṭādhyāyī of Pāṇini, his grammar in eight chapters, but the Ṛg-vēda itself is divided for practical purposes into eight *aṣṭakas*, each of which is again divided into eight *adhyāyas*, or readings. And to these instances we may add the fantastic table given in the Mārkaṇḍeya-purāṇa, in which eight atoms (*paramāṇu*) are said to be equal to one molecule (*para-sūkṣma*), eight molecules to one mote (*trasa-rēṇu*), eight motes to one grain of sand (*rēṇu*), eight grains of sand to one hair-tip (*vālagra*), eight hair-tips to one nit (*likṣā*), eight nits to one louse (*yūka*), eight lice to one barley-grain (*yava*), eight barley-grains to one finger-breadth (*aṅgula*), etc.<sup>2</sup>

The use of the word *kalā* above in the sense of a (sixteenth) part (of the human body) is alone sufficient to suggest that this method of calculation arose from the observation of the moon and its phases such as regularly-recurring religious rites would make inevitable. For this word *kalā* denotes, more particularly, one-sixteenth part of the moon's disc: and not only does the word *ṣoḍaśin*, 'of sixteen parts', occur in connection with sacrificial matters (e.g., as the name of a certain *stotra*, or hymn; the name of a certain day of *sutyā*, or sōma-pressing, etc.), but is an epithet of Prajāpati who in the mystic lore of the upaniṣads is identified with *prāṇa*, the vital breath, and compared to the waxing and waning moon.<sup>3</sup> As all the other *kalās* become gradually merged, as it were, in the sixteenth *kalā*, called *dhruva*, 'fixed' or 'permanent', and then gradually appear again with the new moon, so, according to this lore, the world at dissolution becomes merged in Prajāpati, and the fifteen other elements of man become similarly merged in the *prāṇa* and are thence again produced. At the same time it is clear that for all practical purposes such a division of the half-month into sixteen parts would be worse than useless. The *tithis*, the lunar days, whether of the bright half or of the dark half of the moon, are, of course, but fifteen;<sup>4</sup> nor is it possible for any intelligent method of computation to extend the fortnight (the period of fourteen nights) beyond fifteen days (*quinze jours*).

<sup>1</sup> The *sabb-atthakam dānam*, mentioned in the ninth story (Sumanamālākāravatthu) of the fifth section (Bāla-vaggō) of the commentary on the Dhammapada (ed. for the Pali Text Society by H. C. Norman, vol. ii, p. 45f.)

<sup>2</sup> Barnett, *Antiquities of India*, p. 217.

<sup>3</sup> Deussen, *Die Philosophie der Upanishads*, p. 93 f.

<sup>4</sup> In astronomical terms, the *tithi* is the thirtieth part of a synodic month of 29½ days.



Whence then comes this mysterious number, sixteen, which seems to have been seized upon so readily both by ritual theory and by mystic speculation ; this number whose intimate association with lunar reckoning seems so unmistakable, and yet which such reckoning seems unable clearly to account for ? I believe it can be shown to be highly probable that the word *kalā* is of Dravidic origin, and that this way of calculating by sixteens, or rather by eights, the simpler and probably earlier base—an octaval system of reckoning—is also Dravidic.

But it must at once be made quite clear that the word 'Dravidic' is not here used as a name merely for the language of southern India, as if a Dravidic origin meant necessarily a southern origin. It is well known that Dravidic dialects are spoken to-day by tribes of the Central Provinces and adjacent regions to the north, and as far away as Balūcīstān an isolated dialect, the Brāhūī, has been recognized as belonging to this family. There can be little doubt that, as these facts suggest, the greater part of northern India was in the possession of Dravidians in those early days when the bands of Aryan adventurers made their first incursions and wrested for themselves settlements doubtless in much the same way as their brother Aryans of the west did in ancient Greece, in both cases the new civilization which was thus imported preserving much that belonged to the earlier race. I wish the word 'Dravidic' or 'Dravidian' to be understood in a sense that will include this assumed northern element, with which, indeed, I am intimately concerned in what follows. If we admit thus, for primitive times, the existence of a language or languages in northern India having the peculiarities which are characteristic of those Dravidic languages known to us in other parts of India, especially in the south, we find that considerable light of no mean value is thrown upon Sanskrit, both Vedic and classical, upon the Prakritic dialects, and upon their descendants, the modern vernaculars of Hindūstān. Such languages, under normal conditions, that is to say, when they have not been systematically eradicated, still live on and still make their presence felt. Though they may appear to have been completely supplanted by the language of the invader, yet will always be found scattered fragments of the old speech cropping up here and there like the strange rocks that we may often see breaking through some smooth terrain, and the speakers of the new language will be sure to preserve some traces of the earlier phonetic peculiarities, some traces, though in a new garb, of the earlier ways of thought and turns of fancy. The Keltic language of the greater part of ancient Gaul was replaced by the Latin of Roman colonists and Roman soldiers ; yet not only is there in French of today a very considerable number of vocables of Gallic origin, but its grammatical psychology shows here and there distinct traces of Keltic parentage, so that, for example, French idioms may often be well illustrated by a comparison with those of Irish.

We will deal first with the word *kalā*, 'a sixteenth part'. One looks in vain for any helpful parallels in Avestan ; and the comparisons which have been made with the Greek *κείρω*, 'I cut',<sup>1</sup> or with the Greek *σκάλλω*, 'I hoe', Latin *scal-p-o*, 'I cut, carve, etc.', are not

<sup>1</sup> Grassmann, *Wörterbuch zum Rig-veda.* s. v. *kalā*.



satisfactory. Both of these etymologies assume that this word meant primarily 'a division'; and this would suit well enough. But in the case of the former the original palatal *k* which the Greek represents, would require to be represented in Sanskrit by *ś*, *ṣ*:<sup>1</sup> (cf. *śarad*, 'autumn', *śirṇa*, 'rent, withered,' from this root). In the case of the latter it is true that, with the exception of the loss of the initial sibilant—a common enough occurrence—there are no phonetic objections, yet the rarity of this word in the ancient literature, its absence from the so-nearly-allied Avestan and, still more, its highly specialized meaning even at its first appearance without doubt justify the assumption that this word *kalā* is not Aryan. It occurs once in the *Ṛg-vēda* (viii. 14. 7), and the same verse, without its refrain, is found again twice, with a slight variation in each case, in the *Atharva-vēda* (vi. 46. 3 and xix. 57). In all three instances it stands side by side with the word *śapha*, 'hoof', which is interpreted as 'one-eighth', that being the relation of the half-hoof of cattle to the four feet. The verse, as it appears in the sixth book of the *Atharva-vēda*, is thus translated by Professor Bloomfield:

As one pays off a sixteenth, an eighth or an (entire) debt, thus do we transfer every evil dream upon our enemy.<sup>2</sup>

The association of *kalā* here with *śapha*, 'a hoof', may be purely accidental. But it suggests what seems to me to be a very reasonable explanation of the origin of this word. I would connect it with the Dravidic word *kāl(u)*,<sup>3</sup> 'leg, foot'. Like the Sanskrit *pāda*, this word also means 'a quarter' and is in common use in that sense at the present day in Dravidic-speaking areas. It is from this sense 'quarter' that I consider the notion of 'one-sixteenth' to have probably arisen.

Let me make my position quite clear, confining myself for the sake of simplicity—as I propose to do throughout, wherever it is possible—to Tamil as the main source for details in illustration. It must be pointed out that a Sanskrit word of the feminine gender terminating in *-ā*, if borrowed into Tamil changes this termination into *-ai*:<sup>4</sup> Skt. *gītā* 'song', becomes *kītai*; Skt. *sabhā*, 'an assembly', becomes *avai*, and so forth, and it seems a reasonable assumption that conversely a Dravidic word having the termination which appears in Tamil as *-ai*, if borrowed into Sanskrit, would change its termination into *-ā*. Now Skt. *kalā* has its exact counterpart in Tam. *kalai*. Was the Sanskrit word borrowed from Dravidian, or was the Dravidian word borrowed from Sanskrit? Nothing could be easier or indeed more reasonable than to regard the Tamil word, with its specialized meaning, as a tatsama of the highly specialized Sanskrit word, that is to say, as a word taken over from Sanskrit

<sup>1</sup> *The Pali Text Society's Pali-English Dictionary*, s. v. *kalā*.

<sup>2</sup> *Sacred Books of the East*, vol. xlii, p. 167.

<sup>3</sup> The *u* is sometimes present, sometimes absent. It is a small enunciatory vowel, and forms no essential part of the word.

<sup>4</sup> In Canarese the corresponding termination is *-e*; in Telugu and Malayalam, *-a*.

<sup>5</sup> In all cases Dravidic characters are transliterated, not represented phonetically. A table of the symbols used in transliteration will be found at the end.



without any radical phonetic modifications. But in Tamil, by the side of the noun, there is also a verbal base *kalai* bearing a meaning that seems clearly related to that of the noun. This certainly rather changes the situation, for such a verbal base would seem far more likely to be indigenous than to be due to importation. And the fact that Tamil, like Canarese, shows *l* and not *ḷ* (which, however, is found in Telugu) might be held to be opposed to the notion of a Sanskritic origin. Nevertheless it must be admitted that the exact relation between Skt. *kalā* and Tam. *kalai* remains, for the present, uncertain. All that it is permissible to do is to point out the possibility of *kalai* and its Dravidic congeners being indigenous to their respective languages, whether modified in meaning or not under the influence of Sanskrit.<sup>1</sup> But in any case, whether Tam. *kalai* be an importation or not, it is my contention that its counterpart Skt. *kalā* was originally a Dravidic term connected with a phase of Dravidic culture, and that the Dravidic word *kāl* probably gives us the key to its interpretation.

One would be inclined to expect that a long syllable like *kāl* would show a tendency to shorten when other syllables were added to it as in *kalai*, and examples of such apparent shortening are not wanting. The Tamil verbal root *kāṇ*, 'see', has for its past base *kaṇ-tu*; *tāṇ*, 'self', makes *taṇ-mai*, 'quality'; *pāṭu* 'occurrence', is related to *pālar*, 'sorrow'. On the other hand instances in which no such shortening is found seem to predominate, and we often find long and short standing apparently quite independently side by side. For instance, by the side of the Tamil root *kāṇ*, 'see', just mentioned (which, like other long verbal roots, is quite unaffected by the addition of terminations), we find the noun *kaṇ*, 'eye'; by the side of *pāṇ*, 'singing', *paṇ*, 'music'; and by the side of *nāru* 'to emit fragrance', *naṛu* 'fragrant'. But though we may not perhaps be entitled to regard the short vowel in *kalai* as definitely due to the addition of the termination *-ai*, we are at least justified in regarding *kāl* and *kal-ai* as possible phonetic variants. That is, granted a radical *kāl*, whatever its signification may be, we may admit the possibility of a variant *kāl* bearing the same or a related signification.

The particle *-ai*, seen in *kalai* and other bases, I would tentatively compare with the plural suffix of neuter pronouns such as *av-ai*, 'they, those (things)'.<sup>2</sup> I conceive that it added a sort of abstract-plural connotation. From the notion 'fourth', present in *kāl*/*kal* might thus be derived, by the addition of this particle, the conception of 'fourth-ness' as a quality belonging to many fourths; and such a new base, it seems to me, would be well in a position to express both (1) the notion 'one-sixteenth' (the notion of multiple fourth-ness) and (2) that of having many parts. The former, would, of course, be seen in Skt. *kalā* as a word of Dravidic origin; and therefore, according to

<sup>1</sup> A similar ambiguity appears in the case of Skt. *vinā*, 'the Indian lute', by the side of Tam. *vinai*, and elsewhere.

<sup>2</sup> Compare the compound bases formed similarly with the far commoner plural suffix *-ar*, for example Tamil *malar*, 'flower' (with the same plural connotation as is expressed in Hindi *phūl*, if from Dravidic *pū*, 'flower', plus the plural suffix *(-lu)* as it appears in Telugu); *amar*, (1) 'battle', (2) 'agree' (with the common notion of uniting opposites); Malayalam *kalaru*, 'be mixed, united', etc.



my view, in Tamil *kalai*. The latter would be seen possibly in the Tamil verbal base *kalai* which means 'disperse', that is, 'break up into its many parts (as a crowd)'.

But, we may ask, does this base *kāl/kal*, which has been here suggested as providing an explanation of the Sanskrit and Dravidic words for 'a digit of the moon', also help us to understand other words which in sense suggest the bright digit and in form are not incompatible with such an origin—for instance, Tamil *kālai*, 'early morning, etc.' This word reminds us at once of *kalai*, but it is clear that if it is to be connected directly with this word we must assume a transfer of application from the light of the (young) moon to that of the (young) sun. Such a transfer is intelligible enough; for it is natural that a people, when it passes from a condition in which the moon is all-important into one in which the sun is supreme, should give to its lunar terms, where possible, a solar application. But the transfer of meaning need not have been quite so simple and direct; and, moreover, there are other possible associates for such a word as *kālai* which call for some consideration.

First, there is the Tamil *kāl*<sup>1</sup> meaning 'a shoot, a sprout,' with which we may, I think, justly compare the Sanskrit *kalikā* in the sense 'bud'. This word is doubtless to be identified with Tamil *kāl* 'leg'. According to some the meaning 'sprout' developed out of that of 'stalk'. This is possible, but it seems to me quite as reasonable to see in this *kāl* the underlying notion of 'thrusting out,' which is manifest in another word for 'bud', *tal-ir* (as a verb, 'to bud, shoot-forth'), from the word *tāl*, also meaning 'leg'. The interpretation would certainly be in keeping with another meaning of Sanskrit *kalikā*, namely, 'digit', for nothing could be more natural than to regard the first digit of the moon as a young moon-shoot (compare the name *Kalāṅkura*). In this case the radical sense of *kālā* as a derivative from *kāl/kal*, 'leg', 'quarter', would still be felt. But these two *kalikās* may be different words. The notion of 'thrusting forth' is present in *kālu*, 'shoot forth (as rays, etc.)', but this base has also the meaning 'eject from the mouth, vomit', and probably belongs elsewhere.<sup>2</sup> We may, however, place here legitimately, I think, the base *kali* which means, on the one hand 'grow abundantly, sprout', and, on the other, 'clamour, shout', as well as 'to clamour, to shout'. This base provides a good example of a phenomenon observable, not only in the enraptured utterances of poets, but in the simple products of primitive thought. The distinction between sight and sound does not here exist, or has been utterly neglected, just as must have been the case when such a word as Skt. *ravi*, 'sun',<sup>3</sup> arose (cf. *rava*, 'roar'), or Skt. *caṣ* i.e. *ca-k(a)s*: cf. *vi-kas*, ('to blossom') with its double meaning, 'see' or 'say'. More clearly related in sense to *kalai* than either of these bases would seem to be the base *kālī*, 'rise with lustre (as a heavenly body)'.<sup>4</sup>

Then there are the words *kāl* and *kālam*, meaning 'time'. The

<sup>1</sup> See Winslow, *A Comprehensive Tamil and English Dictionary*, s. v. *kāl*.

<sup>2</sup> See p. 11.

<sup>3</sup> Compare: Thou as a lion roar'st, O Sun,  
Upon thy satellites' vexèd heels.

(Francis Thompson, *Orient Ode*).

<sup>4</sup> See p. 13.



first of these is hardly an independent word. It is used either (1) as a particle which, in composition with a preceding verbal form, becomes a substitute for what in an Indo-germanic language would be a conjunction ('when', etc.), or (2) in composition with *oru*, 'one', with the meaning 'once, sometimes': in Malayalam this last appears also as *ori-kkal*, with *kāl* shortened to *kal*.<sup>1</sup> The second, *kālam*, is the ordinary word for 'time', and denotes also 'day-break'. This word, however, unlike *kāl* (*kal*), which can hardly be regarded as other than purely Dravidic, is ambiguous. The termination *-am* is, of course, not to be confounded with the similar neuter termination of Sanskrit. It belongs certainly to Tamil and has its counterpart in the other Dravidic languages. It forms primary and secondary derivatives such as *nil-am* 'ground, land, earth', from *nil*, 'stand'; *mar-am*, 'evil, sin', by the side of *maru*, 'spot, blemish'; *in-p-am*, 'delight', by the side of *in-pu*, 'delight', from *in*, 'sweet'; *nēr-am*, 'time', from an early *nāyīr*, later *nāyiru*, 'sun'. It is also made the distinctive ending of nouns denoting inanimate objects borrowed from Sanskrit, when the Sanskrit noun ended in the nominative singular in *-as* (in pause *-aḥ*) whether they were neuter, as *manam*, 'mind',<sup>2</sup> from Skt. *manas*, or masculine, as *pākam*, 'share', from Skt. 'bhāga.' It is clear that *kālam* might well be a tatsama of Skt. *kālā*, 'time'. But whether it is a tatsama of this word or not, it cannot, I feel, be separated from *kāl*, 'time': in other words Skt. *kālā* (like Skt. *kalā*) must be regarded as Dravidic in origin.

These examples are enough to show that a word like Tam. *kālī*, beside being compared directly with Tamil *kalai* or Sanskrit *kālā* for its explanation, and thus derived ultimately from Drav. *kāl*, 'leg, foot', might also be regarded as (1) arising directly, like *kāl*, 'sprout', from this base *kāl*; or as (2) immediately connected with the radical element seen in *kāl-i*, 'rise with lustre'; or, again, as (3) belonging to the group represented by *kāl*, *kālam*, 'time'. They exhibit, it is true, no apparent connection with the notion of 'fourthness' which we suggested as part of the connotation of *kalai*, but we have, at least, been led in our investigation from a word denoting a certain period of moon-time to a word, whether related or not, which denotes time in general. This word and the conception which underlies it I wish to consider a little more fully.

In Tamil a common word for 'time' is *porutu*, or *pōtu*. In Canarese we find, corresponding to this, *pottu*; in Telugu *poddu* or *proddu*. 'That time, then' is, in Tamil, *ap-porutu*, and, in common speech, *ap-pō*, with apparently stands for *ap-pōl*, a form which is found in Malayalam; in Telugu it is *ap-pudu*.<sup>3</sup> The radical element is probably seen in Can. *pole*, 'shine, be bright', and in Tel. *pol ucu*

<sup>1</sup> Compare Canarese *ā-gal*, 'that time, then'; *ī-gal* 'this time, now'. It is hardly to be doubted that from *kāl-kal*, in the sense of 'time-reckoning', comes Skt. *kalpa*, 'a cosmic period', Drav. \* *kal-p-am*: cf. Tam. *in-p-am*, 'delight', etc.

<sup>2</sup> Neuter *n*-stems also took on this ending, as *nāmam*, 'name', from Skt. *nāman*. It is important to note that such forms as *manam*, *tavam*, (Skt. *tapas*), *tamam* (Skt. *taṃas*) are identical with those found in Prakrit, which are clearly due to the linguistic tendencies of Dravidic speakers.

<sup>3</sup> Cerebral *ḍ* is due to the *r* which has disappeared: in *poddu* cerebralization apparently does not take place because the consonant is doubled.



'appear, become visible'. In the latter language a verbal base *poducu*, has been formed from the noun, meaning 'to rise', and is used especially of the rising of the heavenly bodies. Indeed this word *porutu* and its cognates are as a matter of fact, variants of an old name for the sun, and they still bear that meaning.<sup>1</sup> It is from the sun as time-measurer that the notion of time has here arisen. But before time was reckoned by suns, that is by days, it was reckoned by moons and by nights. It is important to notice that, although Tel. *podupu*, 'a rising' (from Tel. *poducu*, above), is now used more especially of the rising of the sun, yet one speaks regularly of moon-rise as *nela-podupu* (*nela*=moon), and *porutu* itself is said to be found locally in the sense of 'new moon' in Malayalam.<sup>2</sup> Is it possible that we may see in the Tamil word *kāl* 'time'—which certainly does not mean 'sun'—the reflexion of some Dravidic word for moon, the other great time-measurer? If we may, then the same should be also discernible, if I am correct, in Skt. *kāla*, 'time', and, indeed, more clearly discernible, on account of the early preservation of this word in a varied and extensive literature.

Here I hesitate. It is usual to connect Skt. *kāla*, 'time,' with Skt. *kāla* 'black', and say that it meant originally 'the darkness before dawn', then 'dawn', as a point of time from or to which one might reckon.<sup>3</sup> Equally intelligible, if not more intelligible, it seems to me, would be the explanation of *kāla*, 'time', from the 'bright dawn' as a starting-point, finding here, as elsewhere, a close association between the notion of '(burning) brightness' and of '(burnt) blackness'.<sup>4</sup>

But when one considers how widely spread and how deeply rooted are the superstitious feelings with which the moon is in India regarded; when one realizes the significance of a term like *kālā* as indicating the intimate association of lunar reckoning with primitive ritual; and when, above all, one finds the god who bears the moon as his crest, who is indeed called Sōma, 'the Moon', brought in his epithets into such close relation with this word *kāla*—he is called *Kālā-nātha*, 'lord of *kāla*', *Kālā-nidhi*,<sup>5</sup> 'receptacle of *kāla*'—one feels convinced that the source of this word is to be sought, not in the dawn, or other bright—or even misty—beings of Aryan myth, but in the mysterious moon. How, then, did such a meaning arise? Did the word *kāla* in the sense 'a quarter', from being applied to the quarter-moon, come to be used for the moon itself? Or was *kāl* a name of the moon as 'the Runner', arising from the meaning 'leg, foot'? Or, again, was the moon regarded as a heavenly wheel?<sup>6</sup>—for *kāl* had also this meaning. None of these suggestions seems altogether satisfactory. It is, however, a curious and interesting fact

<sup>1</sup> In Malay the word *hārī*, which represents the Skt. *hari* in the sense of 'sun', similarly means 'a day'.

<sup>2</sup> Gundert, *A Malayalam and English Dictionary*, s. v. *porutu*.

<sup>3</sup> See the Pali Text Society's *Pali-English Dictionary*, s. v. *kāla*.

<sup>4</sup> For instances in Dravidian see p. 10.

<sup>5</sup> *Kālā-nidhi*, 'the receptacle of the *kalās*, or digits', is a name for the moon. It must not, however, be assumed that there is necessarily any close connection between *kalā* and *kāla*, as was done, for instance, by Grassmann in his *Wörterbuch zum Rig-veda*, s. v. *kalā*.

<sup>6</sup> Compare the Sanskrit expression *kāla-cakra*, 'the wheel of time'.



that our moon-crested deity, though apparently not regarded as a runner, was certainly associated with the dance. Śiva is well known in southern India as Nāṭeśa, <sup>1</sup> the lord of *naṭas*, or dancers, and in the north there is the word *tāṇḍava*, which denotes especially the frantic dancing of this deity. This latter word is clearly to be derived from Drav. *tāl*, <sup>2</sup> 'leg', mentioned above; but the parallel base *kāl* seems never to have developed in this direction. I believe it is the 'horned moon', considered as a bull, or as a buffalo, that we have to see—however dim its outline may be—forming the distant background both of Drav. *kāl* and Skt. *kāla*, 'time'.

There is a word *kālai* in Tamil meaning, according to one authority<sup>3</sup> 'bull' or 'bullock', according to another,<sup>4</sup> 'steer, young bullock' and then 'young man, head man in the village districts'. In Malayalam *kāla*, its exact phonetic counterpart, means 'bull'. These words might be regarded as arising from the notion 'male'. The radical *kāl* (or *gāl*) does certainly bear this connotation. It is, however, more usually found in derivatives, and in the shorter form *kāl* (or *gāl*). For example, we have in Tamil *kāl-īru*,<sup>5</sup> 'a young elephant' ;

<sup>1</sup> This name suggests the existence of a ritual dance similar to those of ancient Greece, and, as in Greece so in India, such a dance would seem to have been one of the sources from which the drama arose. The name for a dramatic performance (*nāṭaka*), dramatic art (*nāṭya*) are of course, formed from *naṭa*, to explain which a Sanskrit root *nyt* has been invented and has given rise to many new formations, such as *nytya*, 'dance, mimicry'. The word seems clearly to be Dravidic, and to be connected with Tel. *naḍucu*, 'move, proceed, etc.', Tam. *naṭai*, 'walk, gait, etc.' [Tamil *naṭi*, 'dance, act', is probably to be traced to the Dravidic-Sanskrit root *naṭ*.] The ritual dance here denoted was evidently a sort of processional like that of the Kourētes in Crete (see Jane E. Harrison, *Themis*, p. 7 ff.), though naturally enough wild leaping would not be long absent; it followed certainly in Crete, and the frantic dance of Śiva shows that in India it became a characteristic feature. Greek drama never freed itself from the chorus (*χορός*) originally the name for the body of dancers; and in India a theatre is still called a *nāc-ghar*, that is, a nautch-house. The orchestra (*ὀρχήστρα*), or dancing place, in India would seem to have sometimes been the round threshing floor, if we may compare Tam. *kālari*, 'a circular area for dramatic performances, etc.' with Tam. *kālan*, 'a threshing-floor, etc.' Both words mean also 'a field of battle', and are probably to be connected, on the one hand, with the base seen in *kāl-i* 'exultation, revelry, etc.' and on the other, as indicating its Dravidic source, with Skt. *khala*, 'threshing-floor; field of battle, etc.' It seems to me that one may see to-day just such 'dancing' as one imagines must have taken place on the Dravidic threshing-floors of ancient times in the dancing of Santāl women. Those who have seen this will recall the slow rotatory movement of the line of performers linked arm to arm. The dance is like a solemn procession, but a procession that is constantly wheeling. I suggest that the rotatory nature of this performance may be an indication of its one-time connexion with the limited conditions of a threshing-floor. Time is kept in this dancing by means of drums beaten by men, but when the women break into song, which they do at intervals, their song may be said to follow the rhythm of their feet, rather than that of the drum, which is liable to spasmodic irregularities. And I am inclined to think that, in India generally, musical time must have been similarly marked by means of the feet, rather than with the hands, as it is usually marked now; so that I would connect the Sanskrit word *tāla*, in the sense of 'musical time', not with *tāla*, 'palm tree; palm of the hand', but rather with Dravidic *tāl*, 'foot', mentioned in the text.

<sup>2</sup> The base *tāl*, when modified by the particle *-tu*, becomes in Tamil *tāntu* (*nt* pronounced as *ṇḍ*), 'a leap': from such a stem Skt. *tāṇḍ-av-a* has been formed.

<sup>3</sup> Pope, *Handbook of the Ordinary Dialect of the Tamil Language*.

<sup>4</sup> Winslow, *Tamil and English Dictionary*.

<sup>5</sup> Compare Skt. *kāla-bha*, 'a young elephant or camel'.



in Malayalam *kāṇṭan*,<sup>1</sup> 'the male, especially of the cat'; in Telugu *gaṁḍa*, 'a male, a hero'; in Canarese *gaṇḍu*, 'bravery, a male', (so also in Telugu), and with the long vowel, *kāṇ-me*, 'great valour'. I believe that the notion underlying these words for 'bull', though probably contaminated with the notion 'male', is really from another source, namely, from a base denoting roaring, as of wind or fire or a wild animal, and which sometimes appears as *kāl* (*gāl*), sometimes as *kāl*, i.e. *kāl*.<sup>2</sup> The latter we see, I think, in Tamil *kāl*, 'wind', and probably in the more usual form *kārru* (*kāl-tu* < *kārtu* > *kār-ru*).<sup>3</sup> The former is represented by Mal. *kālu*. This radical, besides meaning 'to bawl, cry', means also, 'to burn' (intr.). In Telugu the corresponding radical shows only the latter sense: *kālu* means 'burn, be consumed, be scalded, baked, etc.', but also 'to shine'; its causative *kālucu*, 'to burn, roast, scorch, etc.' Probably allied with this are Tel. *gaṁḍamu* and Tam. *kāṇṭam*, both meaning 'disaster, baleful influence of the stars'; and almost certainly from this source sprang the name for the Indian fire-water, Tam. *kaḷ* and *kaḷi*.<sup>4</sup> One feels that it is the roaring forest-fire, twin-brother of the roaring storm-wind, that has here been the source of inspiration. The storm-wind, however, is heard in Can. *gāli*, Tel. *gāli*, and, for the speakers of Telugu, something not unlike it, apparently, in the bray of the ass, one of the names for which in that language is *gāli-vāḍu*. This animal is called in Tam. *kāḷa-vāy*, which possibly means 'bull-mouth'. And it seems to me clear that the bull, Tam. *kālai*, like the lion, which in Tamil is *kāli*, received its names from the power of roaring, though, as I have suggested, it is quite possible that the notion of 'male' also entered into the connotation of this word.

When in Sanskrit a bull was called *nada*, 'the roarer', I cannot help feeling that the speakers were conscious of some such Dravidic word as *kālai*; certainly both words seem to be founded on the same idea. Similarly the word *nandin* as the name of Śiva's bull (also of one of his attendants, and of Śiva himself) becomes, I feel,

<sup>1</sup> Pronounced as in Tamil, with *nt*=*nd*; compare *tāṇḍava* from *tāl*. Dravidic *l*, when followed by a stop-consonant, apparently in all cases passed into the nasal of its own class. The development was then two-fold; either the nasal, being voiced, voiced the following consonant so that e.g. *l+t* became *nd*; or being voiceless, as it would seem, became assimilated with the following consonant, so that e.g. *l+t* > *nt* > *tt*. When followed by a nasal, *l* is similarly changed to the nasal of its own class.

<sup>2</sup> In the Tamil, Malayalam and Canarese scripts (and in the last case in the script only) three different *r*'s are represented, but only two *l*'s. In Tamil, moreover, there are nasals corresponding to these *r*'s though these are to be found neither in Malayalam nor in Canarese. It would seem as if one of the primitive *l*-sounds had been lost, or rather had merged into the neighbouring *l*-sounds, just as the original *r*'s in Canarese and in Telugu have merged into one. The *r*-symbols in Tam., Mal. and Can. represent (1) a dental sound, (2) a cerebral sound and (3) a sound lying between these two and which may be called alveolar, though it does not seem to be, or to have been, of a purely alveolar character. As transliterative symbols for these, *r* (dental), *r* (cerebral) and *r* (alveolar) have been assigned. I assume that in primitive Dravidic there were corresponding to these three *r*-sounds (and to the three *n*-sounds of Tamil, which are similarly transliterated as *n*, *ṇ* and *ṇ*) three *l*-sounds, a dental (*l*), a cerebral (*ḷ*) and an alveolar (*ḷ*). The alveolar sounds show a tendency to become cerebral.

<sup>3</sup> Compare, however, the root *kāl/kār* below.

<sup>4</sup> The word *kaḷi* also means 'joy, riot, wantonness, etc.' and is to be compared with Skt. *kali* as a name for the fourth and worst age of the world.



more intelligible in the light of this word ; for there can be no doubt that the radical *nand* is intimately related to the radical *nad* both etymologically, *nad*, (*nnd*) being apparently a weak form of *nand*, and semasiologically, shouting being one of the natural expressions for the feeling of joy. But there is another and commoner word for bull in Sanskrit than either of these, namely, *vṛṣan*, and in the case of this word, too, there seem to be indications of a possible fusion, though they may be due to a similarity of Aryan and Dravidic thought.

The word *vṛṣan*, of course, is Indogermanic : *varšna*, 'male', in Avestan and *ἄρσῃν* (i.e. *Fáρσῃν*), 'male', in Greek are its next of kin. But it is remarkable that nowhere but in India do we find this word developing an affinity with the notion 'rain'. The words *vṛṣṭi*, *varṣa*, 'rain', and the Sanskrit root *vṛṣ*, 'to rain', were from the earliest times associated, wrongly or rightly, with *vṛṣan* and the related *vṛṣa vṛṣabha*, all meaning 'bull'. In the Dravidic of southern India, it is true, we find no exact parallel to this, but even here we do find, I think, the closely related conception of the black, serviceable clouds being like the black, serviceable cattle. The clouds that are the cows of heaven and bring the rain are, of course, a well-known Vedic figure, and one which would seem to belong to the primitive poetic conceptions of both the Aryan and Dravidic community. I would postulate for primitive Dravidic a radical *kāl*,<sup>1</sup> varying with *kār*, the fundamental notion of which arose from the dark storm-clouds, the bringers of rain and wind, which seem clearly to have reminded the early Dravidian of his herd of buffaloes. Such a radical appears in Canarese *kār* (written also *kār* and *kār*), 'blackness ; cloud ; the rainy season', which would seem to be related to *kār*, 'vomit', which in Tamil, as *kālu*, means also 'to discharge, as clouds the rain, lightning, etc.' A shorter form of this root in Canarese *kare* means 'to milk ; cause to flow, emit ; rain, etc.', and with this one may compare the Malayalam *kāli* in the sense of 'cow, cattle ; she-buffalo', and the Tamil *kāli* 'a herd of cows'. In the north of India we should have found in early times, as on the earth so in the sky, not only the cows that give the refreshing moisture but, quite probably, also the bull that roars, but also fertilizes,—the counterpart of *vṛṣan*.<sup>2</sup>

But the place of the sky-bull in the northern India of Dravidic times would seem to have been, not so much among the rain-cows, as in the watery moon. Indeed he seems there to have become the special representative of the moon with its golden horns, the bringer of the seasons, and among them the most important one that gave the rain ; and, as the moon, he became a time-measurer. And just as the word for 'sun', Tamil *porutu*, etc., was used, as we have seen,<sup>3</sup> in the sense of 'time' ; and just as from another name for 'sun', seen in Tamil *nāyiru*, there arose similarly a derivative *nēr-am*, meaning 'time' ;<sup>4</sup> so, it seems to me, in the north, from an early name for

<sup>1</sup> With this compare *kāl* above, which represents another side of the storm-wind's character : the two radicals may be ultimately identical.

<sup>2</sup> In Vedic mythology, of course, the bull is Indra, the storm-god. For his association with rain see especially Rv. vi. 44, vv. 18-21, where *vṛṣa*, *vṛṣabha* are rendered by Manmathanath Dutt in his translation by 'showerer' and similar words.

<sup>3</sup> See p. 7f.

<sup>4</sup> See p. 7.



'moon' there arose, on the one hand, a word corresponding to Tamil *kāl*, 'time', and on the other hand, with the same suffix as is seen in *nēr-am*, the word *kāl-am* or *kā-am*, 'time'. This would appear, borrowed into Sanskrit, as *kāla*: in Prakrit, reflecting as it so largely does the phonetic conditions of Dravidic, we are not surprised to find both *l*'s preserved. But the moon as agent, the giver of the seasons, etc., he would be represented in early Dravidic by some such form as *kāl-an* or *kā-an*. This word, I think, we may see in Sanskrit in the names *Kāla*, *Mahā-kāla*, as epithets of Śiva; and the underlying conception in other epithets—in *Nandi*, 'the Roarer' or 'the Bull'; in *Nandiśa*,<sup>1</sup> 'lord of the bull'; in *Nandivardhana*,<sup>2</sup> 'he that increases or prospers the bull.'

But in *Kāla*, and still more in *Mahā-kāla*, it is not the figure of the horned moon, with all its promise, that presents itself to our minds; far more it is a sense of blackness, darkness, invisibility. Tamil *kālan*, identical with the assumed agentive form above, is a name for *Yama*, and is certainly to be regarded as a tatsama of Skt. *Kāla*, the god of death. Here, I conceive, we have the moon-god from another point of view; and a second Tamil *kālan*, possibly also a tatsama but which may be pure Tamil, will help us to see how it arose. This second *kālan* has for one of its meanings 'one of the unseen planets'.<sup>3</sup> There is no need to suppose that the word *kālan* here means 'the moon', but it is clear that it was felt to be a fitting name for dark invisible objects in the sky; and such was the moon between the months. It is hard to doubt that it is the unseen moon, considered as a black malignant 'planet', that represents the god of death, the lord of the invisible world; the moon as he is during *amāvasyā*, the black bull without his bright horns—a source of great trouble to the primitive mind; the moon-god Śiva, when he has withdrawn into himself all the digits of his crest and left the word in dangerous darkness.

The name *Kāla*, it is clear, has come to be associated mainly with the dark aspect of the moon; more especially, as it seems to me with the invisible moon. But that it could represent the other side of the moon's character, as the bringer of light seems to follow from the apparent identity of the name *Kāla-kaṇṭha* with the name *Nīla-kaṇṭha*, in which, as I suggest, it is replaced by some Dravidian word similar to the Tamil *nīlā*: for this word like *candra* in Sanskrit, denotes the bright moon and the moonlight. As we have seen, this notion of the moon-bull grows out of root-thoughts expressed in root-sounds—in radicals, in bases—which seem to be inextricably intertwined. But—to return to our early examples—we may perhaps see in Tam. *kālai*, 'bull', Tel. *kālu*, 'be scorched', that is, 'blackened', traces of that current of thought from which flowed—

<sup>1</sup> Only another aspect, it seems to me, of *Kāla-nātha*. Notice also the parallel epithets *Kāla-kaṇṭha* and *Nīla-kaṇṭha*. It seems highly probable that in *nīla* we are to see a Dravidic word for moon (cf. Tam. *nīlavu*, *nīlā*) modified, under the influence of popular etymology into a form that was intelligible, viz. *nīla* 'blue'. The same modification has probably taken place in *nīlōtpala*, as a name for the moon-lotus.

<sup>2</sup> This word is also used to denote the day both of full and new moon.

<sup>3</sup> In Winslow's *Tamil and English Dictionary* (s. v. *kōl* 'planet') *kālan* is mentioned among the *kāṇākkōl*, the invisible 'planets' such as *Rahu* and *Kētu*, but is not further defined. It probably stands for *Saturn*.



possibly with much meandering—the darker element in this concept ; while we may possibly catch a glimpse of the brighter stream of thought in Tam. *kāli*, ‘rise with lustre’, primarily, I would suggest, applied to the moon, then, probably as lunar conditions gradually yielded to solar, to the sun, making possible such a form as *kālai*, ‘early morning, etc.’

There is another word for ‘time’ in Tamil, namely *paruvam*. This is, of course, the Sanskrit *parvan*, from which it is formed just as Tam. *nāmam*, ‘name’, from Skt. *nāman*, but showing the Tamil antipathy to conjunct consonants by the insertion of *u* between *r* and *v*. Neither Tam. *paruvam* nor Skt. *parvan* is found in the sense of ‘moon’; though both may mean either full moon or new moon. It seems to me that in this special use of the word *parvan* we may see the superimposing of Aryan terminology, and possibly Aryan thought, upon Dravidian. The Aryan had his own practical way of dividing up the month ; but for both Aryan and Dravidian the new and full moon were common. In naming these the Aryan seems to have adopted the term employed by the Dravidian, namely ‘node’, which he turned into Sanskrit. For the Dravidian the use of such a term would be readily suggested by the bamboo with which he was so familiar. The ordinary word for ‘node’ in Dravidian is the same as that for ‘eye’, to which the node was compared: Tam. *kaṇ*, *kaṇu*; Can. *kaṇ*, *kaṇu*, *kaṇṇu*; Tel. *kanu* or *kannu*. These would go back upon a primitive *kān/kaṇ*, or possibly *kān/kan*.<sup>1</sup> This base seems to have early made its way into Sanskrit. The word *kanda*, ‘a piece, the section of a plant from joint to joint (as of a bamboo)’,<sup>2</sup> seems clearly to contain it ; and I think it may be seen too in *Gāṇḍiva*, the name of the bow of Arjuna ; the bamboo still is largely used for making bows in India. Similarly it seems to be present in *khaṇḍa*, ‘section, etc.’, and possibly also in *kaṇṭha*, ‘the neck’, as one of the most important joints of the body, dividing it as it does into such supremely different segments. But this word for ‘node’ does not seem to have entered into the formation of names for the moon so readily as did the word for digit. Taking into account the ambiguity of the *n*-sound, traces, faint and uncertain, of such formations may possibly be seen in (1) Tamil *kannāl* (-āl, a feminine suffix) as a name of Sarasvatī, the watery one, she whose *vāhana* or vehicle is the peacock (*nīla-kaṇṭha*) with its innumerable moons (*candra*, *candraka*) ; in (2) the name of Kaṇva, associated as he is with Duṣyanta and the lunar kings of northern India ; in (3) that of Kaṁsa, also called *Kalāṅkura*, ‘the *kalā*-sprout’ (that is, evidently, ‘the new moon’) as the enemy of Kṛṣṇa, representing, in the story of his conflict with Kaṁsa, the dark half of the moon in its monthly victory over the bright half ; in (4) Skt. *kānti*,<sup>3</sup> as the name of the tenth *kalā*,

<sup>1</sup> See note 2 on p. 10. The corresponding verbal base in Telugu, *kanu*, *kānu*, ‘see’, is also without the cerebral.

<sup>2</sup> It is interesting to note that the Malay word for ‘bamboo’ (*bambū*) is defined by the abbé Favre in his dictionary (*Dictionnaire malais-français*, Vienna, 1875) as ‘un morceau de bambu d’un nœud à un autre, servant de mesure.’

<sup>3</sup> A derivative, apparently, from the Skt. root *kaṁ*, ‘love’, and expressing the relation believed to exist between love and moonlight, but possibly chosen or preserved because of its similarity to some lost name for the moon, derived from the above word for ‘node’. It would not be impossible to regard Pārvatī



and in the sense 'radiance of the moon'; and in a few other words.<sup>1</sup>

Whether these forms point to the existence of names for the moon formed from the Dravidic word for 'node' or not, it seems clear that the notion of the node was closely associated with lunar calculations. I believe that evidence of such association is seen in the widely spread southern use of *kāni* in the sense of 'one-sixty-fourth,' and further in the Sanskrit *gaṇa*, as the name of the retinue, or member of the retinue, of the moon-deity, Śiva. But leaving these to be considered later on let us return to our word *kalā*—Dravidic *kalai*. It seems to me not improbable that it was under the influence of the Dravidic *kaṇ*, used, as the Sanskrit *parvan* was, to denote a segment of the moon's disc, that this word *kalai* developed the meaning 'joint, to join'. This meaning appears clearly in Can. *kali*, 'join, meet, etc.', Tel. *kaliyu*, 'join, mix, etc.', and in the Dravidic-Sanskrit *kalita*, meaning 'mixed, furnished with', and (from a new root *kal*) *saṁ-kalana*, 'the act of heaping together, junction, addition, etc.'. The meaning 'part', arising readily from either the notion of 'digit' or that of 'node', may have been the first stage in this transition: compare Skt. *sa-kala*, 'with (all) the parts, entire, all', *vi-kala*, 'deficient in its parts, defective', both from *kalā*.<sup>2</sup> And there is another sense of *kalā-kalai* which, it seems to me, this contamination with the word for 'node' made possible, namely, that of 'artistic skill'. I suggest that this has arisen from the notion of 'joining', as a putting together, constructing, contriving, from which sense it passed on to denote 'practice, skill'—in Dravidic, apparently, especially 'martial skill'—and finally 'knowledge', the science of such skill.<sup>3</sup>

(Marāṭhī also Pārvatī) as also reflecting such a name, the Dravidic word for 'node' being here replaced by the Sanskritic, and the form and the sense both modified under the influence of *parvata*, 'mountain'. In Tamil, from *paruvam* it would certainly be possible to form a feminine of agency *paruvatti* (i. e. *paruvam-ti*), and it is conceivable that some such form, with the meaning, 'the lady of the nodes', that is, 'the moon', existed in early times in the Dravidic of the north. Compare for the form Skt. *mālātī*, *Jasminum grandiflorum*, probably to be connected with Tam. *mal-ar*, 'flower' (Dravidic base *māl/mal*).

<sup>1</sup> Compare the Marāṭhī *Khandē-rāv*, *Khandō-bā*, 'an incarnation of Śiva' (Molesworth, *A Dictionary of Marathi and English*). It should be pointed out that the inflected forms of this radical often contain a cerebral stop; for instance, Tel. oblique sg. *kaṁṭi*, pl. *kaṁḍlu*. It seems highly probable that the simple base has made its way into Sanskrit as *kaṇa*, over Prakrit *khana*.

<sup>2</sup> In Tam. *kala*, 'mix, adulterate; mix in friendship; join in battle', *kalanku*, 'be stirred, be confused'; in Tel. *kalacu*, 'trouble, disconcert', *kalaka*, 'turbidity, trouble'; in Can. *kalaku* 'agitate, perturb', *kalanku*, 'perturb, stir' (cf. Skt. *kalaha*, 'dispute, quarrel', *kalanka*, 'blemish, stain'), the base seems to be *kal-am*, with some such sense as 'mud' [as the material out of which the potters (Tam. *kalan-tarunar*) made their pots (*kalam*)?], though there may be contamination with the other base *kali* (to *kalai*), whose main meaning is 'join, unite'.

<sup>3</sup> Magic contriving, magic art, would inevitably form a part of the connotation of this word; and the association of the moon with magic must not be forgotten. It is suggested further on (see pp. 15, 18f.) that the sixty-four *yōginīs* associated with Durgā are a personification of the sixty-four quarter-digits of the moon; and the moon-god Śiva is, of course, the typical *yōgin*, and bears this name. Tam. *kal*, 'learn, study, practise arts'. Can. *kal*, 'learn', etc. I would regard as back-formations from *kalai*. From their northern equivalent I would derive Skt. *kalpa* in the sense of a 'a body of rules on ritual'.



There is one point more to be added before we pass on to consider more particularly what I have called the octaval system of reckoning in India. It is, perhaps, hardly necessary today to emphasize the fact that the cult of patriarchal deities seems to have been regularly preceded by that of matriarchal deities. It was so in India in the case of the moon-deities without a doubt. I consider it quite legitimate to derive the form *try-ambaka*,<sup>1</sup> as a name of Śiva, from that of the name of the corresponding mother-deity, *try-ambikā* (later, *try-ambakā*). Pārvatī has no homonymous counterpart. As I have quite tentatively hinted, it is just conceivable that this name may have originally denoted 'the mistress of the nodes' (*parvan*). In any case, like Durgā and like Gaurī,<sup>2</sup> it is doubtless to be regarded as indicative of matriarchal habits of thought. Kāla, the Indian counterpart of Kālī,<sup>3</sup> is well known to us from Indian literature, but, apart from literature, his name has practically disappeared. He came to replace Kālī, and, as Śiva, he is still supreme. But before him, we may be sure, ruled Kālī; and today she is probably the most popular deity of the whole Indian pantheon. To remind us of her relation to Śiva as Naṭeśa, we have her well-known figure in its frantic dance; to remind us of the buffalo behind the primitive conception of the moon which she represented, we have the expression *kālī-tanaya*, 'a buffalo', literally 'son of a *kālī*', where *kālī* seems to be an early name for 'buffalo cow'.<sup>4</sup> She is associated closely not only with Śiva's *gaṇas*, but with the sixteen mothers, whom I would regard as personifications of the sixteen *kalās*, and also with the sixty-four *yōginīs*, who can hardly be anything else but similar personifications of the quarter-digits. Lastly we have the lonely, learned Sarasvatī, she of the watery places beloved of the buffalo (*sarasvat*), reminding us of Śiva with her dancing, moon-bedecked vehicle, the peacock.

Quite apart from these more or less definite allusions to a bull- or buffalo-moon we find the moon in northern India, clearly associated with a dark animal in the epithets *ēna-bhṛt*, 'bearer of the *ēna*', *ēnāṅka* 'ēna-marked'. The word *ēna* is here rendered by 'black antelope', and there can be no doubt that this was the normally accepted meaning. But it is difficult to separate this word entirely from such forms as Telugu *enu-mu* or *enu-peṁṭi*, 'a female buffalo', *enu-pōtu*, 'a male buffalo'; and I think we may fairly see in these names for the moon some further support for the suggestion that in early Dravidic India, or in parts of it, the characteristically dark buffalo, rather than the bull, was the form in which the moon as a mysterious sky-power

<sup>1</sup> It seems to me that the first part of this word may well be compared with the southern (Tam.) *tiru*- as a prefix resembling in its function the Skt. *śrī*-. Similarly *Tri-kūla*, as the name of various unidentified mountains, becomes more intelligible if we regard it as denoting some holy mount, rather than some mount with three peaks. Is not *Triśaṅku*, who was raised to the stars as the Southern Cross, a personification of the sacred 'chank' (Tam. *caṅku*), the conch-shell so peculiarly honoured in southern India?

<sup>2</sup> As an appellative, *gaurī* denotes the female of a certain species of *buffalo*.

<sup>3</sup> Does the representation of Kālī or Durgā fighting Mahiṣāsura, the buffalo-demon, by the aid of her lion-*vāhana* reflect a confusion between a Kālī that was associated with the buffalo and a Kālī that was associated with the lion (cf. Tam. *kālī* 'lion')? Or does it mark a transition from the one aspect of this deity to the other?

<sup>4</sup> Compare Mal. *kālī*, 'cow, she-buffalo'. It is worth while to notice that in Saṅtālī a buffalo cow-calf is called *kaḍi*, a buffalo bull, *kaḍa* or *kaṇa*.



presented itself to the minds of men. Indeed, when we find in Telugu the word *kāru-pōtu*<sup>1</sup> used to denote a wild male-buffalo and the word *kāru* used to denote anything black, it seems impossible to resist the conclusion that, here at least, the word for 'buffalo' has supplied the word for 'black'. Both the antelope and the buffalo have cloven hoofs. We have seen how one name for such a hoof, namely the Sanskrit *śapha*,<sup>2</sup> was employed to denote the fraction one-eighth. Is it an unreasonable suggestion that the whole animal to which these eight half-hoofs belonged should have given its name to the number eight, or at least should have come to be intimately associated with this number? In Telugu the radical for 'eight' is *en*, Drav. *en*, apparently identical with the radical in Tel. *enu*, in Skt. *ēṇa*. Whatever be the case, whether the dark animal received its name from the number, or—what seems to me more likely—the number eight received its name from the dark animal, or, indeed, if the identity of name is merely accidental, certainly the connexion of the moon with an octaval system becomes still more intelligible; and possibly this association of the moon with the number eight by the side of its association, in the case of the *kalās*, with the number sixteen may throw light upon the existence in India of both an eight-base and a sixteen-base in contemporaneous use.

As to the number of *kalās* as arts there can be no doubt that in ancient India they were spoken of as sixty-four just in the same way as the Greeks spoke of hundred-gated Thebes, or the Romans called a certain insect a centipede, a thing with a hundred legs. For those employing a decimal system of reckoning, a hundred, that is  $10 \times 10$ , is thus often used to denote an indefinite large number, and, similarly, where the system in use was octaval we may expect to find sixty-four, that is  $8 \times 8$ , serving the same purpose. There can, I feel, be as little doubt that the source of this curious method of counting is to be traced to the primitive custom or cult which regarded the moon possibly, in the first place, as representing the number eight<sup>3</sup> and certainly in the second place, as divided into sixteen *kalās* or digits. I have endeavoured to show that this manner of regarding the moon may be with reason attributed to primitive Dravidians of northern India who preceded the Aryans as settlers along the Indus and the Ganges. A consideration of the Dravidic numerals serves to confirm this view.

It is generally accepted nowadays that the numerals in the idioms of southern India are pure Dravidic vocables only as far as the number eight, that the words for 'nine' and 'ten' are importations from Sanskrit. The word for 'ten' in Telugu is *paḍi*, in Tamil and Malayalam *paṭtu*, in Canarese *paṭtu* or *hattu*. The forms in *-tu* are derived from Drav. *padu*, found in composition,<sup>4</sup> by means of the particle *-tu*. This *-tu*—a sort of particularizing particle or suffix—seems here to indicate the end of a series, just as it apparently does in the word for 'eight', Tam., Mal. *eṭtu*, Can. *enṭu*, from Drav. *en* (the composition-form), which stood at the end of what I consider to have

<sup>1</sup> The word *pōtu* means 'male'. Compare, for the radical *kār*, p. 11.

<sup>2</sup> See p. 4.

<sup>3</sup> Compare, in addition to what has been said above, the use of *gaurī* in Sanskrit to denote a girl of eight years.

<sup>4</sup> For example, Tamil *paḷ-in-āru*, 'sixteen'; *iru-paṭu*, 'twenty'.



been the old series. Drav. *padu* is a modification of Drav. *padi*,<sup>1</sup> seen in Telugu, which again seems undoubtedly to be derived from Skt. *pañkti*, or *pañti*, as it is sometimes written. This word, of course, denoted originally a group or row of five (one hand), then, apparently, a row of ten (two hands) and then a row in general. The name Daśa-ratha appears as Pañkti-ratha, Rāvana is known as Pañkti-griṇva as well as Daśa-kandhara (of ten necks); and the metre called *akṣara-pañkti*, though usually regarded as a type of verse consisting of eight lines, each of five syllables, would seem rather to have been regarded—as was its Avestan counterpart—as four lines, each of ten syllables, and to have received its name accordingly. The Sanskrit *pañkti* is not only found in the Dravidic numeral system, it occurs also independently of this, for example, in Tam. *pañti*, 'row, a row of guests seated for a meal; a row of horses or elephants, stables, stalls', which is evidently derived from Skt. *pañti*, read with assimilation of the nasal, as *pañti*, or rather *pañdi*; and in Tam. *patti*, 'row, series, class; column in writing, etc.', formed from the same word with further assimilation of the nasal.

The word 'nine' in Dravidic is derived from the word for 'ten'; and it is derived in two distinct ways. First we have Tam. *on-patu*, Mal. *on-patu*, Can. *om-battu*, formed from *patu*, *pattu*, 'ten', as it would appear, under the influence of Skt. *ūna-vimśati*,<sup>2</sup> 'nineteen', conceived as meaning 'one less (*ūna*) than twenty' (*vimśati*), by prefixing the Dravidic base for 'one', namely *on* or *on*. Secondly we have Tel. *tom-midi* from an original *tol-padi* (or *tol-padi*) over *tom-badi*, *tom-bidi* (with assimilation and vowel-harmony) which also seems to me to have arisen under the influence of *ūna-vimśati*. Whereas, however, the Sanskrit word denotes a deficient twenty, the Dravidic denoted, rather, a defective ten. Caldwell, it is true, thought the Dravidic word might denote 'the number before ten'.<sup>3</sup> This, I feel, is far less probable. The Dravidic base *tol* (*tol*) certainly came to signify, 'old, former,' etc., Tam. *tonṭu* (i.e. *tol-tu*), for instance, means 'antiquity—the before-time'; it also, like Tel. *tom-bidi*, means 'nine'. But I hardly think that we are justified in interpreting this word in the latter case either as 'the number before ten', or even

<sup>1</sup> From an earlier *pañdi*: cf. Tam. *pañti*, below. That apparently no trace of an original *n* is found in these words for 'ten' makes certainly against this derivation. But two considerations greatly lessen the force of this objection. First, the *-tt* of forms like *pattu* may stand for *-nt* (representing *-ntt*); cf. Tam. *patti*, 'row, etc.', which is certainly from Skt. *pañ(k)ti*, and see note below. Secondly haplological omission may account for both such forms as *on-pa(n)tu* (see next paragraph) and for such as *pa(n)t-in-āru*.

<sup>2</sup> This Sanskrit form does not affect the Dravidic word for 'nineteen', where it might well have been expected that Sanskrit influence would first have made itself felt. The word for 'nineteen' in Dravidic is made up of the two words for 'ten' and 'nine', for instance Tam. *paṭṭ-onpattu*; and it is reasonable to suppose that the constraint of system in the scheme of numbers has eliminated or prevented the influence of Sanskrit at this point, the numbers one to nine being exactly repeated in the numbers eleven to nineteen, and so on. Caldwell in his *Comparative Grammar* (1913), pp. 349-50, suggested a 'Turanian' type, but if the Dravidic word for 'ten' is rightly derived from the Skt. *pañkti* which however, Caldwell was not prepared to admit (*ibid.*, p. 353), it seems natural to suppose that the word for 'nine' also shows in its formation traces of Sanskrit influence.

<sup>3</sup> *A Comparative Grammar of the Dravidian or Southern Indian Family of Languages*, 1913, p. 348.



ās 'the before (*i.e.* old) number ten'. Its true interpretation, as of Tel. *tom-bidi*, is clearly indicated, it seems to me, by the Tamil verbal base *tol*, which means, primarily, 'to perforate'; by Can. *tole*, 'hole', etc. It seems clear that 'nine' was regarded in much the same way as a perforated cowrie (H. *kānī kauṛī*) was regarded: it was a ten with a defect in it, a defective ten. The notion of 'antiquity' would follow readily, for is it not the old cowries that are perforated, the old things that have holes in them?

I have already alluded to the apparent terminal nature of the Dravidic word for 'eight' as indicated by its form. That it was formerly thus regarded as a terminal is made still more probable by the existence of such words as Tam. *eṇṇu* (compare the compositional form of the word for 'eight', *eṇ*), 'count, guess, think, ponder, etc.', with which we may well compare the Greek *πεντάζω*, 'count, reckon, consider', originally 'to count on the five fingers', from the Greek word for 'five'. All this is now further confirmed by our consideration of the almost certainly Sanskrit origin of the Dravidic word for 'ten', and is entirely in harmony with the custom—it would seem to have been an hieratic custom—of dividing the moon's disc into sixteen parts. It would, of course, be quite possible to regard this sixteen-fold division of the moon's disc as reflecting an already existant octaval system. It seems to me, however, more probable that the reverse is the case, that lunar reckoning preceded and gave rise to a widely prevalent practice of reckoning by eights—or by sixteens. At the same time it must be borne in mind that such a system of reckoning could hardly fail, popularly if not hieratically, to be accompanied by and associated with the habit of counting upon the fingers of each hand; and, indeed, it would be rash to assert that such a habit played no part in the building up of this system.<sup>1</sup> As I view the case, it did not play the main part.

The moon's disc was first divided, naturally enough, into four parts; each of these was then again divided into four parts; and then again each of these was further divided into four parts. These last, the quarter-digits were called *yōginīs* and, I have suggested, were personified as witches or sorceresses (*yōginī*) attendant upon Kālī or

<sup>1</sup> In Bengal the word *gaṇḍā* denotes an aggregate of four, originally of four cowries; *gaṇḍākiyā*, the method of counting by such *gaṇḍās*. Here certainly we find evidence of a four-group being employed in counting; and, of course, rupees are so counted today in most parts of India. We may, I think, compare with this use of half-eight as a unit the converse use of *pañkti* in Sanskrit with the meaning twice-five, the single or the double hand being regarded at will as the initial group; as also were, apparently, eight and sixteen, ten and twenty, which last, the score, is generally held to have reference to both hands and feet. It is interesting and important to note that here too we seem to have the same stem *kan* as, we have suggested, is to be seen in Skt. *khaṇḍa* and *kāṇḍa* (p. 13). The Hindūstānī *gaṇḍā* also denotes an aggregate of four as well as the method of counting by fours: but, besides being used in these senses, it may also mean (1) 'a joint; a reed; sugar-cane,' and (2) 'a ring, a circle, especially a magic circle or one which is supposed to act as a charm or amulet *i.e.*, as an obstacle or impediment to the influence of evil spirits, etc.' (Platts, *Hindūstānī Dictionary*). Here we may see, not only confirmation of the connexion of this word with *kan*, 'node', so intimately associated, as it seems to me, with the moon and the measurement of moon-time, but also what may be fairly regarded as a reminiscence of moon-magic.



Durgā,<sup>1</sup> a moon-goddess. It is, however, quite possible that the word *yōginī*, as here employed, was not in the first instance associated with magic, but meant merely 'a joint', or 'a little joint'<sup>2</sup> being derived from the Sanskrit word *yōga* in the sense of 'joining, union, etc.', under the influence of the Dravidic word for 'joint' *kān/kan* to which I have already alluded as providing the Dravidic substrate of the Sanskrit *parvan* in its association with the moon. The specialized sense of *yōginī* as a name, not merely for a small part of the moon's disc, but for a sixty-fourth part, is intelligible if we assume that among the northern Dravidians the name for the sixty-fourth part of the moon's disc was a derivative from *kān/kan*, as *yōginī* from *yōga*. Such a word, conveying precisely this lunar sense, is not found: but there is a well-known word in the Dravidic idioms of today which bears the general sense of 'one sixty-fourth part' and of which there are also clear traces in the idioms of the north. This word is (Tam., Mal., Can.) *kāni*, whose connexion with the word for 'joint, node', is unmistakable. For the traces of this word in the north it may be sufficient to refer to the Bengālī *kāni* or *kāṇi*, as the name of a measure of land which, at least in eastern Bengal (Tipperah) is equal to one-sixteenth of a 'doran', the Skt. *drōṇa*. This word is phonetically identical with the Dravidian word, and, in meaning, may be compared with the Tamil *mā-kāni*, that is 'great *kāni*', which means 'one-sixteenth'; though, of course, the Bengālī *kāni* may have been the sixty-fourth part of some measure four times as great as the 'doran', which is no longer in use.<sup>3</sup> In any case it seems probable that we have in Skt. *kākinī*, which means 'one-fourth of a *māsa*', that is to say, 'one-sixty-fourth of a *karṣa*' (a *karṣa* being the weight of a coin in common use in earlier times, namely the *karṣāpāna*), a Sanskritization of this Bengālī word *kāni*, or of one of its Prakritic peers.

With these *yōginīs*, the attendants upon Durgā and, by a later transference, upon her consort Śiva, I cannot refrain from associating the *gaṇas*.<sup>4</sup> These are, of course, in classical literature, the special followers of Śiva and are sometimes spoken of collectively as 'the host', a sense denoted by the same word *gaṇa*! But if Śiva is the leader of the *gaṇas*, Gaṇa-nāyaka, Durgā holds an identical position as Gaṇa-nāyikā; and she is, moreover, as Pārvatī, the mother of the *gaṇas*, Gaṇa-janani. It is the same story, it seems to me, of the

<sup>1</sup> Durgā herself is known as Yōginī, evidently a projection of the group of *yōginīs*, just as the name Mother (*mātṛ*) which she bears may mark a similar individualization of the group of sixteen mothers, the *kalās*, as I would suggest; both being instances of primitive generalization.

<sup>2</sup> Rather, perhaps, 'one of many joints', as *padminī*, denotes not only a lotus but a bed of lotuses, and *rāginī*, one of the whole series of modified *rāgas*, or (characterized) musical modes.

<sup>3</sup> May we not see in the Hindūstānī *ānā*, 'an anna', as the sixteenth part of a rupee, a similar use, or misuse, of this fraction? It seems to me not improbable that forms like *du-annī* (*du-ānī*), 'a two-anna piece, two annas', *cau-annī* (*cau-ānī*), 'a four-anna piece, four annas', etc., may be derived from earlier *dvi-kāni*, *catu(r)-kāni*, etc., with loss of intervocalic *-k-*. The frequent use of such compound forms would then have given rise to an assumed singular *āna* (*ka*), pairing off with the compositional form *-ānī* as, for instance, does Skt. *vēda* with *vēdī*, in *tri-vēdī*, 'the three Vedas', etc.

<sup>4</sup> If we may regard Ṛṣya-śṛṅga, as I think we should, as another presentation of the 'horned moon', it is interesting to find him so closely associated with *gaṇikās* in the story of his magic power of producing rain.



moon and its nodes or divisions<sup>1</sup>: only here we are amongst the Indian Olympians, respectable married deities and their offspring. Gaṇeśa, the son, who continues his father's title as 'lord of the *ganās*', is, I would suggest, the new moon; he represents that auspicious moment when we in the west still feel as if we ought to turn over the money that is in our pockets, or the keys—anything metal—for 'luck'; the time when sympathetic magic would lead the primitive mind to feel that every undertaking then begun must grow and prosper along with the growing moon. And Kumāra, the other son, I would regard as the new moon also. But he is the new moon as the bright power that overcomes the malignant forces of darkness when, month by month, they seize upon the light of heaven's friendly lamp.

To return to the octaval system and its sequel the sedecimal, if my contention is sound, if we admit that in the earliest times there existed among the Dravidians of India a method of counting by eight and that this method only gradually gave place to the decimal system which the Aryans brought with them, then at once certain other numerical peculiarities find a satisfactory explanation. These peculiarities arise from the conflict of two systems, or from an attempt to find a *via media* between them. The predilection for the number eighteen,<sup>2</sup> found throughout Indian literature, would seem to arise by a compromise between the decimal and the octaval systems ( $10 + 8 = 18$ ), and the number eighty ( $10 \times 8$ ), which not infrequently varies with sixty-four,<sup>3</sup> seems also to bear the stamp of such a compromise. Other instances of such interplay appear to arise rather from the collision of the sedecimal system, as a method of counting and expressing more readily higher groups by means of a double-eight, with a similar method used by the Aryans in which a double-ten was employed for this purpose.

The former prevalence of sixteen as a group-number in northern India is made manifest linguistically by the fact that the medial cerebral which this number legitimately shows—Sanskrit *ṣoḍaśa* (from *ṣaṣ-daśa*), Pāli *soḷasa*—has, in modern Hindi and other vernaculars, influenced the whole series of the tens from eleven to eighteen, changing an original *d*,<sup>4</sup> over *d*, into *r*.<sup>4</sup> The Pāli form shows in its *ḷ*,

<sup>1</sup> The word *gaṇa* seems clearly to be connected, like *kāṇi*, with the Dravidic base *kāṇ/kan*. From these words denoting divisions of the moon and providing a means of computing time has arisen, it would seem, the general notion of computing, reckoning, expressed in Sanskrit by the radical *gaṇ* (of Dravidic origin). The relation between *gaṇ*- and *kan*- may be compared with that between *gāṇḍ*- and *kāṇḍ*- (p. 13) and probably with that between *gaṇḍ*- (note on p. 18) and *khaṇḍ*- (p. 13). The Sanskrit root *gaṇ* is, of course, usually regarded as standing for *gṛn*, and connected with the Greek *ἀγείρω*, 'collect'.

<sup>2</sup> It may be sufficient to mention the eighteen *purāṇas*; the eighteen kinds of learning, that find a place in both Sanskrit and Buddhist literature; and the Pāli expression *aṭṭhārasa-kōṭi*(*ya*), 'of eighteen *kōṭis*', to denote a great mass or multitude.

<sup>3</sup> For instance, *kāṇi*, in Malayalam, may mean, not only 'one-sixty-fourth,' but also 'one-eightieth', and this is the usual meaning of the word in Tamil.

<sup>4</sup> This is, or at least was, of the nature of a cerebral (Hoernle, *A Comparative Grammar of the Gaudian Languages*, p. 13). The frequent interchange of *r* and *ḷ*, both in Pāli and in Dravidic, shows that these sounds were not felt to be greatly different: both have become practically merged into one in modern Malayalam. It is possible, but, I think, less likely, that the cerebralization of the



it may be noted in passing, what I would regard as a Dravidic phoneticism; and, similarly, the prevailing modern forms, Hindi *gyārah*, 'eleven', *bārah*, 'twelve', etc., show in their final a change of Prakritic *s* (itself a rough approximation to the original palatal *ś*) to a silent *h*, which is also common enough in early Dravidic borrowings, there having been apparently, no true sibilant in northern, and none possibly in primitive, Dravidic. In northern India at the present day higher numbers are ordinarily counted by twenties, by pairs of tens. This method may be Indogermanic; for the Indogermanic word for twenty (*ui-kmt-i*) has a dual ending, and the dual was originally employed to denote, not two, but a pair; the method of counting by twenties or scores, moreover, is found among the Kelts and among the Teutons. But it seems to me quite conceivable that in India the twice-eight system called into being the twice-ten system as its decimal counterpart. However this may be, it seems quite clear that these two systems existed side by side in early times, and it would be quite possible to regard the above-mentioned preference for the number eighteen as more especially due to a compromise between the Aryan twenty and the Dravidic sixteen, rather than to the simple combination of Aryan ten with Dravidic eight. But what appears to be conclusive evidence of such contamination, involving a confusion between name and number, is to be found in the use of Skt. *vimśa*, 'one-twentieth part', to denote 'one-sixteenth part' in all the languages of southern India: Tam. *viṁsa*, Mal. *viśam*, Can. *visa*, Tel. *viṣamu*, evidently all Dravidized forms of the Sanskrit word, with vowel-lengthening in compensation for the loss of nasalization as, for example, in Tam. *ciyam*, 'lion', from Skt. *simha*.<sup>1</sup> These terms were employed primarily in connexion with the weighing of the precious metals, and they denoted the amount of gold or silver that was equal in weight to one grain of rice. There was sixteen times this amount of gold in the gold *paṇa* (commonly spoken of as a *tanam*), and sixteen times this amount of silver in the silver *paṇa*,<sup>2</sup> the typically Dravidian currency of the south.

A *paṇa*, in Sanskrit, meant also a coin having the value of eighty cowries. This is, of course, the modern obsolescent *paṇ* as the name for an aggregate of eighty cowries, the fifth part of an anna; which, like the Sanskrit word, bears also the meaning 'handful'. This meaning is suggestive. In measuring grains it would be not unnatural to reckon by means of (double) handfuls;<sup>3</sup> and we may well imagine that, in paying for them, the cowries—which, of course, in earlier times were a widely-spread medium of traffic with a value probably due to their demand for purposes of ornament—were treated similarly. Such double handfuls of cowries would necessarily vary in the number contained; but, according to my contention, the

*d* took place by regressive assimilation at a time when *ś* was not differentiated in pronunciation from *s*; cf. Mahārāṣṭrī *dahai*, 'he burns', arising apparently from Skt. *dahati* under the influence of forms like the future *dhakṣyati*; Bengālī *dā(i)na* (for *dāhina*), 'right', Skt. *dakṣiṇa*, etc.

<sup>1</sup> Pāli *sīha*, which again shows close approximation to the Dravidic form.

<sup>2</sup> The occurrence here again of the number sixteen should be noted.

<sup>3</sup> Compare the use of Skt. *muṣṭi*, 'handful', to denote a certain dry measure; of Beng. *kuñci* or *khumcī*, related apparently to *kuñcika*, 'branch or shoot of the bamboo', in the sense 'a measure of eight handfuls'. The word *paṇa* itself (for *\*pāṇa*) is clearly akin to the word *pāṇi* (for *\*pālṇi*), 'hand'.



Dravid would be satisfied if it was not less than sixteen, about sixteen; the Aryan, if it were not less than twenty, about twenty, these numbers being their respective bases for higher calculations. Five of these handfuls would make, in the one case, a 'round' hundred; four, in the other case a 'round' sixty-four. The Aryan five got the upper hand, and five handfuls became a customary standard, a 'round' number (eighty) being thus eventually arrived at which was common to the systems of higher calculations of both parties. The next step, where Aryan influence prevailed as it did in the north of India, was inevitable. The Dravidic system broke down.

In Hindūstānī the word for 'score', used in such calculations is *koṛī*. The corresponding word in Bengal is *kuṛī*, and it would not be impossible to see in this, as a term prevailing at an early time in this centre of commerce, the source of Hindi *koṛī* and to derive both from the Dravidic base *kuṛī* (Tam., Can. *kuri*, Tel. *guri*) which denotes an aim, a mark, an end, a limit. The close connexion between the sounds represented by the symbols *r* and *ṛ* has already been pointed out;<sup>1</sup> and that the difference between the sounds represented in Bengālī script by the equivalents of the nāgarī *ō* and *u* is, for the present day certainly, practically negligible, a glance in any Bengālī dictionary will make manifest. It seems, however, more reasonable to connect *koṛī*, and probably also *kuṛī*, more immediately with the Sanskrit word *kōṭi* or *koṭi*. This word seems also to be of Dravidic origin, for it can hardly be separated from the Dravidic base which is seen in Can. *kudi*, 'top; sprout; pointed flame; flag', Tel. *kodi*, 'top; mark; flame; flag', Mal. *koṭi*, 'top, extremity; sprout; flag'. 'Tam. *koti*, 'creeping plant; standard, etc.' The original meaning of this base and of Skt. *kōṭi*,<sup>2</sup> would thus seem to have been, not merely 'an end-point', but 'the point or end of something curving', as of a bow, a sprout, a flame, or a flag.<sup>3</sup> There is agreement, however, between this base and the base *kuṛī*, with which it may be ultimately related, in respect of that which here concerns us most, namely, that both may be used to denote an end or limit. The end which *koṛī* and *kuṛī* were employed to denote was the end of a summation, just as Skt. *kōṭi* itself was employed to denote a summation, a limit in counting, when it was given the meaning 'crore'.<sup>4</sup> The limit marked by *koṛī* and *kuṛī* was a more practical one. Today it is the limit of a twenty-group, adopted as a basis for more conveniently reckoning and naming higher numbers. Formerly, if my contention is right, it marked the limit of a sixteen-group employed in precisely the same way and fulfilling precisely the same purpose.

That such a cultural shift in the manner of reckoning has taken place is, I think, confirmed by a consideration of some of the names for weights which are employed in the Malay Archipelago and which

<sup>1</sup> See note 2 on p. 10.

<sup>2</sup> The long *o* in this word would be due to its importation into Sanskrit, in which short *o* did not exist, or at least was unrepresented.

<sup>3</sup> The notion of 'curving' is also seen in Tam. *kuṭu-mi*, 'a man's single lock of hair'; (Drav.-)Skt. *kuṭi-la*, or *kuṭ-ila*, 'crooked, tortuous, fraudulent', etc.

<sup>4</sup> Hindi *karōṛ*, which seems clearly to be from the same word *kōṭi*, but curtailed in popular use and showing a modification of the initial consonant, under the influence of the final, similar to that seen in the vulgar pronunciation of 'theatre' as *thre-atre*.



would seem clearly to have found their way there as the result of an active commercial intercourse in early times between India and China. We all know the word (tea-)caddy. It is from these parts and denotes a certain weight (of tea), originally a weight of sixteen Chinese ounces (liang or tael). In the Arabic script in common use in the Archipelago this word is not distinguished from the word for 'crore' or 'lac'.<sup>1</sup> The latter is identified with the Sanskrit *koṭi*, and it seems highly probable that the former is to be similarly derived, namely from *koṭi* in that sense of 'limit in counting' which has given the modern word *koṭi*, but that, having been introduced at a very early date, it has preserved its old octaval sense. We find, I think, also an early representative of our word *kāni*, namely, in the word which is usually written 'candareen'.<sup>2</sup> Cerebral *n* is certainly sometimes represented in Malay by *nr*,<sup>3</sup> and between *n* and *r*, *d* is a very natural glide; the nasalizing of the final vowel would appear to be characteristic of Malay. A candareen is the one-hundredth part of a liang or tael: and this is also the value of the Chinese *fēn*. Now the Chinese character which represents the word *fēn*, is made up of two elements, one of which denotes a knife, an instrument for cutting, and the other the number eight. So that it seems fairly clear that in early times the *fēn* must have stood for the fraction of one-sixty-fourth (the eighth of an eighth of a liang or tael), as *kāni* does in India, and only later, with the in-coming of decimal calculation, came to denote the one-hundredth part.

To this intercourse between India and China, it may be remarked by the way, is due the existence of certain terms for mediums of exchange which are common to these two countries. Mal. *kāsu*, Tam. *kācu*, Can., Tel. *kāsu* are certainly to be identified with the 'cash' of China, the Chinese *ch'ien*, the name of those copper coins of former days that were perforated in order that they might be strung together and carried more easily. The Malay *pēkū*, which stands for the Chinese *pai ko*, 'a hundred pieces', that is, 'a hundred "cash"', reminds one curiously of the Telugu *paikamu* in the sense of 'cash, money'. The word for 'cash' (literally, 'a hundred "cash"') in Java is *pīcis* (Malay *pītis*): have we not here the parent of another Indian word for money namely *paisā*? The Sanskrit *māṣa* seems certainly to be discernible in the Malay 'mace',<sup>4</sup> 'the tenth part of a

<sup>1</sup> At least this is the case in the dictionary of the abbé Favre. Here both are written كتي, which is transliterated, in the case of the first word mentioned above, as *kati*; in the case of the other, as *keti*. A weight of one hundred 'caddies', or 'catties', is called a *pī-kul*, where the final element seems to suggest the original presence of a cerebral sound, if we may compare Malay *gūla*, 'sugar', with Skt. *gūḍa*, 'molasses': but this is a doubtful matter. For the *pī*-compare what is said in the next paragraph of the text. It should be remarked that the Indian word for 'a score' is undoubtedly to be seen in the Malay *kōdī*. If my contention is right, however, this would be a later importation, as, indeed, the *d*, for *t*, in this word would seem to indicate a later stage than the *t*, for *l*, in *kati*.

<sup>2</sup> Probably the *kundir* (كندري), 'un certain petit poids d'or', of Favre. Compare also *kenderi* (كندري), 'ancienne monnaie de douze à quinze duwits'.

<sup>3</sup> For example, Skt. *kunapa*, 'corpse', is represented in Malay by *kunarpa*. Sometimes it is represented by *rn*, as in *berniyāga* ' (one) who traffics', from Skt. *vanijya*, 'trade, traffic' (Favre).

<sup>4</sup> Written *amās* (امس) and *mās* (مس) by Favre and defined as 'la seizième partie du tael'.



Chinese tael or ounce';<sup>1</sup> and *pāi*, which in India is the name of an insignificant copper coin, now rarely to be met with, is remarkably similar to the Chinese name for the insignificant cowrie, especially in the form *puai*' which it is said to have had in ancient times.<sup>2</sup>

But to return: we find in Sanskrit the words *koṭira* and *koṭira*, both bearing the meaning 'hair collected on the forehead by ascetics in the shape of a horn'. The former is also given by Indian lexicographers as an epithet of Indra. Such matted and braided hair (*jaṭā*) is better known to us today as characteristic of Śaiva ascetics and of Śiva himself, the successor of Indra as god-with-the-bull. These words appear to be simple derivatives, primarily adjectival, from Skt. *koṭi koṭi*, formed like, for example, *mukha-ra*, 'talkative', from *mukha*, 'mouth'. The resemblance of such matted hair to a horn is unmistakable enough. But I consider that it would be equally appropriate to liken it to a shell, and I imagine that everyone who has seen typical specimens of the *jaṭā* in, let us say, the holy places of Benares, would agree with me. As a matter of fact the braided hair of a Śaiva ascetic is actually spoken of as a *kaparda*, or shell; and this word, along with its derivative *kapardin* is one of the epithets of Śiva. Are *koṭi* and *kaparda* related? The origin of *kaparda* is unknown, but theoretically such a relationship is quite conceivable. One might, indeed, be even tempted to suggest that we may see in *kaparda* an instance of false Sanskritization, or that, at any rate, its diminutive *kapardikā*, which denotes a small shell or cowrie, has arisen in this way from some Middle Indian form of *koṭi*, or rather *koṭi*. The *-o-* of a form *koḍi*, one might contend, has been changed into *-ava-*, just as it was, apparently, in the word *yavana* for *yōna* (compare the Greek plural *Ἴωνες* 'the Ionians'), and then further Sanskritized into *-apa-*, as has apparently happened in the case of *kapata*, 'deceit' (compare Tam. *koṭu*, 'crookedness, etc.').<sup>3</sup> the *ḍ* being then treated as if its cerebral character were due to a preceding *r*. But the word *kapardin* is found as early as the hymns of the R̥g-vēda,<sup>4</sup> and it is reasonable to suppose that the relation between these two words, if such there be, is the reverse of this, and that *koṭira* and *koṭira* arose, not perhaps directly from Skt. *koṭi*, *koṭi*, but, under the influence of this pair, by the Sanskritization of a form *koḍira*, which came into being at a time when *kapardikā* had been Prakritized, over *kavaḍ(ḍ)īā* into *kavaḍi* and *koḍi*. But of course, it is possible, that there is really no radical connexion between them, and that the epithets *koṭira* and *kapardin* express quite independently one and the same thing from two different points of view, the former having regard to the pointed, horn-like character of the Śaiva head-gear, the latter to its resemblance to a (pointed?) shell.

Such a Prakrit *koḍi*, the representative of Skt. *kapardikā*, whether it is to be seen reflected in the Sanskrit *koṭira*, *koṭira* or not, would pass by a regular change into a modern *koṭi*. It would thus become

<sup>1</sup> *The Century Dictionary*.

<sup>2</sup> Karlgren, *Analytic Dictionary of Chinese and Sino-Japanese*, Paris, 1923, p. 217.

<sup>3</sup> Also (Skt.) *kaṭa*, 'fraudulent, false', and the base mentioned above as the probable source of Sanskrit *koṭi*.

<sup>4</sup> It occurs, usually, associated with Rudra, Pūṣan or Indra; once, however, it is used as an epithet of the Trisus (Rv. vii. 83.8), and once as an epithet of Indra's bull (Rv. x. 102.8).



identical with the Hindī word for a group-number—now a score—which we have sought to connect with Skt. *koṭi*, *koṭi*. But the modern representative in Hindī of the Sanskrit *kapardikā* is *kauṛī*, not *koṛī*. It would seem as if some need for differentiation between these two forms had been felt and met. It is conceivable that the shorter form in *-o-* may have been retained to indicate the group-number under the influence of a northern Dravidic *koṭi* or *koḍi* whose short vowel may well have affected the Prakritic pronunciation of *koṭi*, its Sanskrit representative, as I suggest. The fuller form in *-au-*, assigned to the shell, may have arisen in one of two ways; either from a Prakritic by-form *kavud(d)īā*, *kavudī*, in which the second vowel (*a*) has been assimilated by the preceding labial (*v*), or by the adoption of a dialectic variant. In the latter case one would naturally think of the coast of Bengal and its immediate neighbourhood, since it is in this part of India that the use of the cowrie possibly arose and certainly prevailed at an early time.<sup>1</sup> Here, as a matter of fact, we find in Oriyā and in the fourteenth century Bengālī of Caṇḍidās a form *kauḍī* which could well mark the source from which the *au*-vocalization of Hindī sprang. This form goes back, apparently, upon an earlier *kavadi*, to be found in the early Bengālī texts collected as *Bauddha-gāna o dōhā*;<sup>2</sup> and from this earlier form have arisen the names for cowrie in use in the Dravidic countries further south—Can. *kavadi*, Tam. *kavati* (a mere difference of spelling), Mal. *kavati* and *kaviti*.

The undoubted connexion of the word *kapardikā* with the word *kauṛī* would be more intelligible from a semasiological point of view if we might assume (1) that *kaparda* denoted originally a pointed protuberance like a horn,<sup>3</sup> or an arrangement of the hair resembling such a protuberance; (2) that this word, or its derivative *kapardikā*, came then to be applied to a certain pointed shell, the conch (*śankha*), which was similar in general shape to the *kaparda* and which, like this, played a conspicuous part in priestly ceremonial; and then (3) when the cowrie rose into prominence as a medium of exchange, to this shell as *the* shell with which every one was familiar. The first of these assumptions would seem to be warranted by the existence side by side in post-vēdic Sanskrit of the two epithets *kapardin* and *koṭira*, both, apparently, having reference to the same manner of arranging the hair. With regard to the other two all one can say is that neither *kapardin* nor *koṭira*, as epithets descriptive of a manner of wearing the hair, could have had reference to the cowrie, since this shell is quite small, is not spiral, and has no point.

We have pointed out that the word for cowrie as a representative of the Sanskrit *kapardikā* would naturally have assumed a form *koṛī* identical with that of the word denoting a certain group-number, now twenty. We have, indeed, suggested that this word for cowrie is to be seen in the first element of the words *koṭī-ra*, *koṭī-ra*, though they

<sup>1</sup> See, for instance, *The Travels of Marco Polo the Venetian*, bk. II, chap. xxxix and note on page 245 of the *Everyman's Library* edition, which speaks of boat-loads of the Bengal *kari*, i.e. cowrie, being collected in Sylhet, near the Chinese frontier, and transported to Fort William at some time, apparently, in the eighteenth century.

<sup>2</sup> Edited by Haraprasād Śāstrī, Calcutta, 1917.

<sup>3</sup> With a *kapar-da* having this sense one might perhaps compare Ved. *kapy-th*, *membrum virile*, Latin *caper*, 'goat', Germ. *Hafer*, as 'the spiked grain', etc.



could hardly have had reference to the shell which is now known by this name, and, moreover, in this case it would be extremely difficult to maintain the connexion of these words with the Sanskrit *kōṭi*, the assumed parent of the modern *kōṛi*, 'a score'. But whatever the actual connexion may be between the present-day names *kauṛi* and *kōṛi*, or even if they must be regarded as etymologically quite unrelated, in practice we may be sure they were from the earliest times very intimately associated. The relation of cowries to counting is clear. In Bengālī *kaṛā* means 'one (in reckoning cowries or shells)', in Santālī this appears as *koḍa*, which is defined as 'in arithmetic one'.<sup>1</sup> But cowries would seem to have been regarded as members of groups rather than individually, much in the same way as the 'cash' of China were regarded. We have already met with one such group, that consisting of four cowries, the Bengālī *gandā*.<sup>2</sup> If my contention as to the one-time prevalence of an octaval system of reckoning is correct, we may be tolerably certain that names also existed for groups of eight and for groups of sixteen cowries. That for the eight-group seems to have definitely disappeared.<sup>3</sup> But I suggest that the name for the sixteen-group is still preserved in the word *kōṛi*, employed, however, nowadays to denote the new group of twenty which, it seems to me, has taken its place. The number sixteen possessed ritual sanction. It was a convenient base for calculating and expressing such higher groups as thirty-two, sixty-four and others, the conventional use of which would inevitably have long survived the introduction and regular employment of the decimal system of counting for ordinary use. What wonder if the name expressing this group lived on also? And what wonder if, as the old group of a double-eight gradually made way for the new group of a double-ten, the name which had denoted the one was transferred to the other and that, as in the south, a word denoting one-twentieth came to be employed in the sense of one-sixteenth, so here, as an indication of quite similar cultural conditions, the word for a group of sixteen came to be employed to denote a group of twenty?

As we have already seen, the older method of counting was closely associated with cowries. It is probable that, besides being counted in a particular way as a medium of exchange, these shells were also frequently employed, after a similar fashion, as counters when more or less complex calculations had to be made. Now I have tried to show the probability that this older system was one in which the word *kōṛi*, earlier *koḍi*, was used to denote the group-number sixteen (probably also, at an earlier period, the group-number eight). To count by *kōṛis*, therefore, and to count by *kauṛis* might well have meant one and the same thing, and one might feel tempted to see in this apparent equivalence an independent argument for the identity of these two words. But the linguistic evidence is distinctly not in favour of such an identification. It would involve the assumption that both *kōṛi* and *kauṛi*, as also Can. *kavaḍi*, etc., go back upon the same Prakritic *koḍi*. This in itself would not be impossible, but such a collocation leaves the relation between *kauṛi* and the Sanskrit

<sup>1</sup> Campbell, *A Santali-English Dictionary*.

<sup>2</sup> See note on page 18.

<sup>3</sup> One name may have done duty both for the eight-group and for the sixteen-group, just as Skt. *pañkti* may denote either a group of five or a group of ten.



*kapardikā* unnecessarily problematic and can hardly be seriously maintained. But if counting by *kōṛis* did at one time mean the same thing as counting by *kauris*, it would not be strange if a transfer of meaning had taken place and if the word *kauri* should have been sometimes used in the sense of 'sixteen'. This may possibly have happened in Malayalam. Here we meet with the compound verb *kaviṭi-kaṇakku*, which is said to mean 'to calculate with cowries on the decimal system'.<sup>1</sup> Cowries, we must judge from this, might be, or have been, reckoned according to some system which was not the decimal. That system can hardly have been any other than the octaval, with its characteristic sixteen-base for higher numbers; so that *kaviṭi* in this expression, if it did not actually assume the meaning 'sixteen', was certainly well on its way towards acquiring such a meaning.

#### POSTSCRIPT

It is curious to observe how often the number eight or multiples of this number find their way into the accounts of the life of Asōka. He is the son of Bindusāra, who had *sixteen* wives.<sup>2</sup> In edict VII we read of *eight* means which he adopted for the promotion of piety.<sup>3</sup> According to Megasthenes his city of Pātaliputra had *sixty-four* gates.<sup>4</sup> And the occurrence of the number 156 at the end of the first minor rock inscription<sup>5</sup> finds its simplest explanation if we regard it, to use a pardonable Irishism, as a sedecimal centenary. To Asōka the fact seemed worth recording that *sixteen* times *sixteen* years had elapsed since the 'departure' of the Buddha. Moreover the arrangements for dealing with military and civil matters respectively in the time of his grandfather, Candragupta, as reported by Megasthenes seems clearly to reflect lunar notions of time. The heads of each department were *thirty* in number, and they met in each case in *six* boards of five members each.<sup>6</sup> A similar division of the thirty days of the moon-year, or month, would help us to understand why the Indian sun-year is divided into six seasons; and much more. But we are not here concerned with lunar reckoning in general but with a particular method of reckoning which seems to have had its origin in lunar times, namely the octaval.

Traces of this predilection for the number eight are discernible also in Chinese. We have seen how the symbol for 'eight' enters into the ideogram for a certain Chinese weight. The same ideogram denotes also the act of dividing, and is, in itself, a clear indication of a tendency to cut things into eight parts. The 'caddy' of tea, as we have also seen, consisted of sixteen ounces, the ounce here really representing the Chinese liang, *sixteen* of which make a Chinese *chin*. Then we meet with such categories as the eight (mystic) diagrams, the *eight* (annual) festivals, the *eight* views, that is, sights worth seeing in any neighbourhood, familiar both in China and Japan:<sup>7</sup> and there are

<sup>1</sup> Gundert, *A Malayalam and English Dictionary* s.v. *kaviṭi*.

<sup>2</sup> V. A. Smith, *Asoka*, p. 160.

<sup>3</sup> *Ibid.*, p. 153 ff.

<sup>4</sup> *Ibid.*, p. 81.

<sup>5</sup> *Ibid.*, p. 139.

<sup>6</sup> *Ibid.*, pp. 77-82.

<sup>7</sup> Chamberlain, *Things Japanese*, p. 331.



probably many others. It would almost seem as if this manner of counting and grouping, which spreads over so wide an area in the east, formed a part of that culture which, as has been suggested, was shared by the ancestors of the Chinese with the Sumerians in the earliest times, possibly in some common home, and that the Dravidic habit to a consideration of which these pages have been mainly devoted, represents the outcome of Sumerian influence in primitive India. The latter suggestion would be quite in keeping with the fact that one of the Assyrian-Babylonian determinatives for numbers, which has as its syllabic value, that is, as its Sumerian original, *kan* or *gan*,<sup>1</sup> is identical in form with the base seen in Gaṇēśa, in all probability, as I have tried to show, a moon-deity, and with the Dravidic-Sanskritic root *gaṇ*—related to Tamil *kaṇ*, 'node', etc.—which means 'to count'.<sup>2</sup>

<sup>1</sup> So King, *First Steps in Assyrian*, p. ciii: the sign is used to indicate order, grade.

<sup>2</sup> It is interesting to note that the ideogram for the eight festivals contains the radical for 'bamboo'. This group is known as *pa chieh*, i.e., the eight joints, or nodes, the festivals being held at certain node-like turning-points of the year, viz. the first day of each of the four seasons, the two solstices, and the two equinoxes. The symbol for 'bamboo' is also seen in the sign for the numerative *ko* (p. 23); in the word *tēng*, 'grade, class', which is often used as a sign of the plural; in the word *suan*, 'calculate', etc.



# TRANSLITERATION-TABLE

	Nāgarī.	Tamil.	Malayalam.	Canarese.	Telugu.		Nāgarī.	Tamil.	Malayalam.	Canarese.	Telugu.
a	अ	அ	അ	ಆ	ఆ	th	ఠ	—	o	అ	అ
ā	आ	ஆ	ആ	ಆ	ఆ	d	డ	—	u	ఇ	ఇ
i	इ	இ	ഇ	ಇ	ఇ	dh	ఢ	—	ū	ఉ	ఉ
ī	ई	ஈ	ഈ	ಈ	ఊ	n	ణ	ణ	ṛ	ఋ	ఋ
u	उ	உ	ഉ	ಉ	ఉ	t	త	த	ṙ	ౠ	ౠ
ū	ऊ	ஊ	ഊ	ಊ	ఊ	th	थ	—	ṛ	ఋ	ఋ
r	र	—	ര	ರ	రు	d	द	—	ṛ	ఋ	ఋ
r̄	र̄	—	ര̄	ರ̄	రు̄	dh	ध	—	ṛ	ఋ	ఋ
l	ल	—	ല	ಲ	లు	n	न	ந	ṛ	ఋ	ఋ
ē	—	எ	എ	ಎ	ఏ	n	—	ன	—	—	—
ē	ए	ஏ	ഈ	ಉ	ఊ	p	प	ப	ṛ	ఋ	ఋ
o	—	ஒ	ഒ	ಉ	ఊ	ph	फ	—	ṛ	ఋ	ఋ
ō	ओ	ஓ	ഓ	ಊ	ఊ	b	ब	—	ṛ	ఋ	ఋ
ai	ऐ	ஐ	ഐ	ಊ	ఊ	bh	भ	—	ṛ	ఋ	ఋ
au	औ	ஔ	ഔ	ಊ	ఊ	m	म	ம	ṛ	ఋ	ఋ
m	—	—	ం	ం	ం	y	य	ய	ṛ	ఋ	ఋ
k	क	க	ക	ಕ	క	r	र	ர	ṛ	ఋ	ఋ
kh	ख	—	ഖ	ಖ	ఖ	r̄	—	ర	ṛ	ఋ	ఋ
g	ग	—	ഗ	ಗ	గ	r̄	—	ర	ṛ	ఋ	ఋ
gh	घ	—	ഘ	ಘ	ఘ	l	ल	ల	ṛ	ఋ	ఋ
n	ङ	ங	ങ	ಙ	ఙ	l̄	ळ	ల	ṛ	ఋ	ఋ
c	च	ச	ച	ಚ	చ	s	स	(ஸ)	ṛ	ఋ	ఋ
ch	छ	—	ഛ	ಞ	ఞ	s̄	श	—	ṛ	ఋ	ఋ
j	ज	(ജ)	ജ	ಜ	జ	s̄	ष	(ష)	ṛ	ఋ	ఋ
jh	झ	—	ఱ	ఱ	ఱ	h	ह	(హ)	ṛ	ఋ	ఋ
ñ	ञ	ஞ	ഞ	ఱ	ఱ	h̄	—	—	ṛ	ఋ	ఋ
t	ट	ட	ട	ట	ట	h̄	—	ఁ	ṛ	ఋ	ఋ