

Harald Wiese¹

Ordeals: An economic vindication of Ancient Indian ‘Non-sense’

¹ University of Leipzig, Postfach 920, D-04009 Leipzig, Germany, tel.: 49 341 97 33 771, e-mail: wiese@wifa.uni-leipzig.de

The author is thankful for many helpful hints, by anonymous referees and also by David Brick, Alexander Fink, Ely Franco, Hendrik Kohrs, Richard Lariviere, Peter Leeson, Katharina Lotzen, Maria Schetelich, and Hermann Sonntag.

Content matters

I. INTRODUCTION	4
II. LEESON'S THEORY OF ORDEALS	7
III. TEXTS	9
A. Agreement by defendant	10
B. High success rate	10
C. Manipulability	11
D. Doubtful matters	11
E. Rituals	12
F. Non-application for nonbelievers	14
G. Serious offences	15
H. Agreement by accuser	15
IV. THE EXTENDED LEESON MODEL	17
V. CONCLUSION	18
APPENDIX A: LEESON'S THEORY	21
APPENDIX B: EXTENDING THE LEESON MODEL	23
APPENDIX C: LEESON'S THEORY FOR RESTORATIVE ORDEALS	26
ABBREVIATIONS	28
REFERENCES	28

Abstract:

Ordeals (by fire, by water, etc.) are a judicial institution in which a defendant tries to prove his innocence by divine judgement. In a recent law-and-economics paper, Leeson (2012) suggests that (medieval) ordeals “work” because (and if) ordeal takers have sufficient belief in them and because the priests administering ordeals “manipulate” them in an appropriate manner. We find that Leeson’s theory also helps one understand Indian ordeals. Interestingly, some dharma texts require that the accuser agrees to the ordeal, also, a requirement absent in Leeson’s theory. We extend Leeson’s model accordingly.

Keywords:

ordeals; decision theory; game theory

I. Introduction

In many Old Indian law texts and other texts, ordeals are described that are to convict the guilty defendant and to clear the innocent one. According to *Manu* 8.114 (in Olivelle 2005: 173), a defendant is to “carry fire, stay submerged in water, or touch separately the heads of his sons and wife. When the blazing fire does not burn a man, the water does not push him up to the surface, and no misfortune quickly strikes him, he should be judged innocent by reason of his oath.”

Ordeals go by several terms, mainly *divya* (most common) and *daiva* where *divya* is short for *divyapramāṇa* (“divine evidence”) in contrast to human evidence (witnesses, documents, or possession). Briefly, we often encounter these ordeals²:

- In the fire (*agni*) ordeal a hot object (often a ball of iron) has to be carried by the defendant. If his hands show no signs of burning, he is considered innocent.
- The ordeal by balance (*dhaṭa*) rests on the idea that a defendant who has declared his innocence is lighter than before. In that case, he is cleared. In some texts, an increase (rather than a decrease) in a defendant’s weight indicates innocence (see Lariviere 1981: 29-30).
- Undergoing the ordeal by water (*jala*) involves submerging under water and staying there until another person has regained an arrow discharged at the time of submerging. Innocence is proven if the runner is back in time.
- The ordeal by poison (*viṣa*) means that the defendant is given some amount of poison. If no serious effects are seen, the defendant is cleared.
- In the ordeal by holy water (*koṣa*), the defendant is to drink some sacred water. If then, for some time, he is not hit by a calamity, he is cleared.
- Similar to the fire ordeal, the heated-coin (*taptamāṣa*) ordeal is passed if the hand remains unhurt, here by fetching a coin from a vessel filled with boiling butter.
- In the ordeal by rice (*tanḍula*), the accused eats “white grains of rice mixed with water in which an image of the Sun-god has been bathed” (Patkar 1978: 102 ff.). If he can do so without showing signs of injury in his mouth, he has successfully passed this ordeal.
- The plough-share (*phāla*) is similar to the ordeal by fire or by heated coins. A heated plough-share has to be licked and the test is about the tongue being burnt or not.
- The ordeal by religious merit (*dharma*) involves choosing between balls made of earth. One stands for *dharma*, the other for *adharma*. The lucky defendant has chosen the *dharma* ball.

² See, for example, Stenzler (1855: 665-77), Schlagintweit (1866: 9-36), Scriba (1902: 25-35), Lariviere (1981: 28-54), or Patkar (1987: 98-103).

It is important for our later argument that all these ordeals give the ordeal officer ample scope for manipulation (but see the conclusions for some qualifications regarding the priests' motives and understandings). First of all, some ordeals may, by their nature, provide a better success rate than others. This is probably related to rules that differentiate between defendants according to caste. For example, we read in the *Nāradaśmṛti* (Nā 20.47, see beginning of section III): “He should not administer the poison to a brāhmaṇa, nor should a kṣatriya carry the iron; a vaiśya should not be plunged into water, nor should a śūdra be allowed to drink Holy Water.”

Second, a given ordeal can be manipulated: The fire, the water, and the poison ordeals can be administered in such a way as to increase or decrease the probability of success (from the ordeal taker's point of view). In particular, the iron ball can be more or less hot (fire ordeal), the bow more or less strong and the runner slow or fast (water ordeal), and the poison more or less toxic. Consider also the balance ordeal. It should not be difficult for the official carrying out the ordeal to ensure that the accused weighs more at the second weighing (or less, whatever the necessary conditions may be). After all, the official needs to apply marks on some wooden sticks. Since the weights (before and after claiming innocence) are about the same, there is obvious room for manipulation by an official who is not closely monitored by others. Finally, as mentioned above, there is a debate as to whether an increase or a decrease is indicative of innocence.

Usually, ordeals are thought to occur in a “standard” setting: a person was formally accused of a crime and brought before a judge. If human evidence was not sufficient, an ordeal was carried out sometimes. Brick (2010) argues that a second kind of ordeal is described in old and more recent texts that has by and large escaped the notice of indologists. Here, “someone was widely believed to have committed some wrongdoing, but was not forced to stand trial. In order to prove his innocence and, thereby, mitigate the damage caused by his suspected guilt, such an individual could –and sometimes did –arrange for himself to undergo an ordeal at his own expense and independently of any formal complaint” (Brick 2010: 26). This second, non-standard form of ordeal is labelled “restorative” because of the ordeal taker's “desire to restore his prior social status” (Brick 2010: 26). In this paper, we mostly use “ordeal” in the sense of standard ordeals, but consider restorative ordeals in the conclusion and in appendix C.

In modern times, ordeals (of both kinds) seem to be strange legal institutions. For people in early and medieval India, they did not. Lariviere (1981: xii-xiii) compares ordeals to sacrifices: “The question of how ordeals “work” is no more likely than is the question of how sacrifices “work”: they “work” because of the

nature of the universe as these men of faith understood it. An ordeal was a religious act in the sense that one prayed to a deity for assistance –the “workings” of ordeals were a matter of faith.”

Nearly 40 years ago, Derrett (1978) tried to vindicate this “Ancient Indian ‘Non-sense’” (quoting from the title of his short article) and suggested that the ordeals might have worked for some physiological reason. With respect to the fire ordeal, Derrett (1978:103) writes: “A person of quiet conscience who knows no reason why he should not survive an ordeal is likely to have his pores closed, and will escape blisters more easily than one who sweats with fear of detection.” Or, referring to the water ordeal, Derrett (1978: 103) explains: “A man who is quiet in mind can hold his breath under water for far longer than a man who is frightened or has his pulse-rate increased for whatever other reason.”

Understandably, Lariviere (1981: 30) is unconvinced by these arguments (in particular with respect to the balance ordeal³) and offers the following insight: “The important thing is that the administrators of ordeals and those undergoing them *believed* [emphasis in the original] that they would render a correct verdict. It was this faith that allowed the institution of ordeals to be successfully employed.”

As if following up on Lariviere’s comment, the economist Leeson (2012) explains why ordeals could work. Here is his idea. The credibility of ordeals needed to be supported by producing “correct” verdicts most of the time. The officials responsible for the ordeal separate innocent and guilty people in the following manner. Innocent people undergo the ordeal and guilty people do not. This separating outcome ensues if the accused are sufficiently convinced that ordeals correctly allocate innocence and guilt. The crucial point is that the ordeal officer himself does not (need to) believe in the ordeal, but manipulates the ordeal so that most of them are successfully passed. In Leeson’s words, the ordeal, supposedly *iudicium Dei*, is in fact a *iudicium cleri*. In this line of thought, the ordeal officer may appear “manipulative” and “cynical”. See, however, the conclusions for more cautious interpretations of the ordeal officers’ states of mind.

Referring back to Lariviere above, the faith of the ordeal takers, but not of the ordeal administrators is crucial in Leeson’s theory. We will spell out this theory in section II and, in a more formal and detailed manner, in appendix A. While Leeson looked at European examples from the Middle Ages, one may check his theory against important Indian sources. Indeed, the Indian texts presented in section III show how Leeson’s theory helps one understand Indian ordeals. Or, inversely, we find Indian evidence supporting his economic theory. The Indian requirements put down in law texts would seem to extend Leeson’s model. We

³ Derrett’s explanation of balance ordeals is particularly involved and we do not need to go into it.

present this “extended Leeson model” in section IV and, again more formally and more detailed, in appendix B. Section V concludes.

II. Leeson’s theory of ordeals

Leeson (2012) explains how ordeals work in the framework of a simple model. Let us consider someone who is accused of a misdeed. In particular, he may be accused of not paying back a loan that he allegedly has taken from the accuser. Or he may be accused of not handing back a deposit that was placed with him (or so the accuser claims). Before him, he has the choice of submitting to an ordeal or refusing to do so. If he refuses the ordeal, he implicitly confesses his wrongdoing and undergoes a “non-ordeal punishment”. It may be a monetary fine or a number of whippings, or the amount of money to be paid (back) to the accuser. The ordeal may confirm his innocence (zero punishment, zero payment to accuser) or may find him guilty.

If the accused’s guilt is proven by the ordeal, he suffers the “ordeal punishment” which one would expect to be larger than the non-ordeal punishment. The difference may stem from the fact that the unsuccessful ordeal is very unpleasant or even life-threatening. Also, one may safely assume that a person found guilty via ordeal had to pay for the ordeal’s elaborate performance. This added an extra financial incentive to just plead guilty, that is, take the non-ordeal punishment.

Leeson (2012: 696-7) first assumes that the accused strongly believes that an ordeal can find out whether he is innocent or not. Differently put, the ordeal is indeed a *iudicium Dei*. If innocent, he will choose to undergo the ordeal and expect to receive zero punishment rather than suffering the non-ordeal punishment. If the accused is guilty, he declines the ordeal because the non-ordeal punishment is smaller than the ordeal punishment which he expects for sure.

Without this strong belief, the accused is not sure whether the ordeal detects his guilt or innocence without fail (Leeson 2012: 699-704). If he is innocent and undergoes the ordeal, he may be cleared for one of two reasons. Firstly, he entertains the belief that God (possibly) reveals his innocence. Secondly, if God is not behind the ordeal, he thinks that the ordeal’s outcome is managed (manipulated) by the ordeal officer. For want of better information, the defendant assumes that the officer will acquit him with some probability given that God is not involved in the ordeal.

If the defendant is guilty, then (from the defendant’s point of view) the ordeal will clear him with a lower probability than the innocent defendant. In so far as

the ordeal is indeed a *iudicium Dei*, he will not be cleared. He can only hope for the officer's acquittal (given that God is not behind the ordeal).

In appendix A, we derive the conditions under which an innocent defendant chooses to undergo the ordeal and also the conditions under which a guilty defendant does. If the model's parameters (the punishments, the strength of belief in the ordeal, the assumed acquittal probability) are propitious, it may well be the case that the innocent defendant voluntarily submits to the ordeal while the guilty one does not. Indeed, the stronger the belief in the ordeal, the more likely such a "separating" outcome.

Let us now assume that the punishments are given (detailed in law books or determined by custom) and that the belief in ordeals is also (by and large) fixed. The latter might be expected to change slowly, only. Then, one can ask the question of how to fix the acquittal probability in such manner that the ordeal separates innocent and guilty defendants. However, and in contrast to what Leeson seems to think, the ordeal officer does not directly fix this probability. After all, the acquittal probability is imagined by defendants and the officer fixes the success rate with which the defendants that enter the ordeal are cleared. In the long run, this success rate (percentage of people actually cleared by the ordeal) is positively linked to the acquittal probability (imagined percentage of people being acquitted given that the ordeal is not *iudicium Dei*) in a manner detailed in appendix A.

We can now make a few remarks about belief and success dynamics (similar to those by Leeson 2012: 701-4): Assume that the ordeal officer observes that every accused person who is offered an ordeal declines it. Then, ordeals apparently do not separate (unless everyone accused is guilty) and ordeal taking should be made more attractive for accused people who are innocent. This can be done by increasing the success rate and hence, the acquittal probability. In contrast, if the officer observes an unusual amount of ordeal taking, he may come to the conclusion that guilty people also take the ordeal. In that case, he should lower the success rate.

Leeson's ordeal theory suggests the following important features of ordeals:

- A. Agreement by defendant (concerning undergoing an ordeal, not concerning the specific type of ordeal) (see Leeson 2012: 696-7, 699-700)
This is the most important point resulting from Leeson's theory. Separating innocent and guilty defendants would not be possible otherwise.
- B. High success rate (see Leeson 2012: 705-8)
If separation occurs, most of the innocent defendants should be cleared.
- C. Manipulability, i.e., determination of success rate by ordeal officer (see Leeson 2012: 697-9, but also appendix A)

Ordeal officers manipulate the success rates in order to make the defendants' beliefs consistent. Manipulation can refer to the specifics of a given ordeal or to the kind of ordeal chosen.

D. Doubtful matters

The credibility of ordeals can be sustained, only, if the officers are not caught in delivering misjudgements too often (see Leeson 2012: 695-6, 704).

E. Rituals (see Leeson 2012: 704-5)

Separating is possible for believers, only.

F. Non-application for nonbelievers (see Leeson 2012: 708)

We find that most of the above features were present in early and medieval India, also. Additionally, we will see that two further points (not addressed by Leeson) need to be mentioned:

G. Serious offences

In order to uphold and strengthen the dignity of ordeals, Gods are not to be bothered with trifling matters.

H. Agreement by accuser

In order to put some risk on accusing somebody, ordeals often foresee negative consequences for the accuser should the defendant be cleared. Therefore, accusers should also be in a position to agree to an ordeal or not.

III. Texts

We now check whether the features A through H (mentioned in the previous section) are reflected in Early Indian and Medieval Indian texts, such as the *Āpastamba dharmasūtra*, the *smṛtis* according to *Nārada* (indicated by Nā⁴), *Yājñavalkya*, *Viṣṇu*⁵ (Vi), *Pitāmaha*⁶ (Pi) and also the *Lekhapaddhati Lekhapañcāśikā*⁷ (LL). The sixteenth-century Bengali *Divyatattva* of Raghunandana Bhaṭṭācārya (Lariviere 1981) quotes and comments upon ordeal sections in various law texts. According to David Brick (in a private communication), it is a highly conservative work that captures the entire preceding pan-Indian tradition

⁴ We use the text and the translation by Lariviere (2003) where chapter 1 of the *vyavahārapādāni* is found on pp. 91-156 and 273-332, respectively. The second chapter of the "Addenda" is also addressed as chapter 20 and found on pp. 233-240 and 447-453, respectively.

⁵ Edited and translated by Olivelle (2009). Ordeals are dealt with on pp. 67-71, 254-263.

⁶ This text exists in fragments only. 200 double lines were collected and translated (into German) by Scriba (1902). *Pi* 28-189 deal with ordeals.

⁷ This collection of samples of records and letters written in Gujarātī Sanskrit (13th to 15th century) has been translated and commented upon by Strauch (2002).

on ordeals. For citing *Dharmakośa* (Dhko), *Kātyāyana* (K), *Pitāmaha* (Pi), or *Yājñavalkya* (Y), we use the *Divyatattva* (DT) whenever possible.

A. *Agreement by defendant*

In the *Lekhapaddhati Lekhapañcāsikā*, some ordeal documents are to be found. These documents clearly point to “agreement by defendant”. For example, in one document (LL: 141, 316), we have an accused making the declaration: “If I have committed this or that crime, then I am stained in the ordeal [*divye*] determined by the important men [mentioned before].”

In a similar fashion, this Gujarati collection contains formulaic verses suitable for specific ordeals. In LL (153, 336), a defendant preparing for the water ordeal has to proclaim: “O Varuṇa, you are the protector of people, the self of all life, o Lord. Let [me who is] innocent swim, o just one; make me sink [if] guilty” (*varuṇa tvam prajāpālah sarvajīvātmakaḥ prabho śuddhaṃ tāraya dharmmātman aśuddhaṃ majjayasva māṃ*).

We should expect that confession makes the ordeal unnecessary. Also, the fact that the accuser’s consent is stressed in most major law texts, may be taken as an indication that consent of the defendant was understood.

B. *High success rate*

The texts do not offer any statistical material. There is some indication, however, that ordeals tended to get easier to pass over the centuries.⁸ It is also instructive to compare the words used for ordeal takers. It seems that earlier texts tend to use neutral expressions like *abhiyukta* (“defendant”, Vi 9.21 and Nā 20.5), *puruṣa* (“man”, Vi 10.5), *nara* (“man”, Vi 10.13 and Nā 20.10) or no explicit designation at all. The medieval *Divyatattva* rarely employs a neutral term like *abhiśasta* (“accused”, DT 173.1), but the usual term is the gerundive *śodhya* (DT 168.1 or 259.2, for example) which literally means the “one who is to be purified or vindicated” (Lariviere 1981: 17). In a private communication, David Brick expresses his view that Indian ordeals assumed the clearance of the accused as a general, but not absolute rule. A significant, albeit indirect, “proof” is the article by Brick (2010) which is entirely about the clearance of the accused via ordeals.

⁸ Stenzler (1855: 669) writes: “Die Vorsichtsmaßnahmen steigern sich zu dem Grade, dass während ehemals die Unschuld durch ein Wunder gerettet wurde, später fast ein Wunder geschehen musste, wenn der Schuld die verdiente Strafe zu Theil werden sollte”.

Turning to the ordeal requirements, Nā 20.21 offers a second chance in the fire ordeal: “If he drops the iron ball out of fear, but appears to be unburned, he must carry it again” (*bhayād vā pātayate yas tv adagdho yo vibhāvvyate punas tam hārayel loham*). Also, the very last regulation Nā 20.48 stipulates that the fire ordeal is not to be carried out in the hot season (*na loham hārayed grīṣme*). Perhaps, in the hot season, the hot ball takes too long to cool off? Tellingly, Nā 20.28 and Nā 20.36 stipulate that the water and poison ordeals are not to be inflicted on weak persons (women, sick, elderly).

Also, some formulaic verses indicate that the ordeal is carried out in the expectation of success. Indeed, we find DT 137 = Pi 102cd+103: “This man who is accused in the trial desires to be cleared, you ought justly to rescue such a man from this suspicion” (*vyavahārābhiśasto ’yaṃ mānuṣaḥ śuddhim icchati tad enaṃ saṃśayād asmād dharmatas trātum arhasi*).

C. Manipulability

Against the possibility of manipulation, one may point out (as did an anonymous referee) that “the mechanics of the ordeals, such as the construction of the balance and its calibration, were carried out by lay experts in such areas: carpenters, goldsmiths, merchants, blacksmiths, and the like. Further, ordeals were carried out in the open with the participation of numerous individuals; see, for example, the descriptions of the water ordeal. If such events were to be manipulated, there would have to be conspiracy among a significant number of people.”

However, the evidence presented in B above and also the remarks following the list of ordeals in the introduction clearly point to the possibility of manipulation, both in the selection of ordeals as in the minute details of them. The holy-water ordeal seems so much poised for success that Nā 20.45 forbids its application to people that are guilty with a high apriori probability, such as those that are accused of grave offenses (*mahāparādhe*), are devoid of righteousness (*nirdharme*), ungrateful (*kṛtaghne*) etc.

We also find instructive the iron-ball example cited in B where a second chance was offered if the ordeal taker dropped the ball “out of fear”. Now, a priest might easily say a few shorter or longer prayers before again placing the ball in the defendant’s hand.

D. Doubtful matters

In *Āpastamba* 29.5-6 (in Olivelle 2000: 115) we find that lawsuits should be carried out “in doubtful cases investigating the matter by examining the evidence

and using ordeals” (*saṁdehe liṅgato daiveneti vicinitya*). Here the order of (i) “from evidence” (*liṅgataḥ*) and (ii) “by means of an ordeal” (*daivena*) stresses the principle of “doubtful matters”.⁹

According to Nā 1.214-219, other means of providing evidence have to come first: If payment cannot be obtained by any other means (document, witness, timely reminder, indirect proof), a creditor can try to make the debtor undergo ordeals. Lariviere (1981: 13) comments: “If there is palpable human evidence on which to base a decision, then there is no need to resort to the gods, but if there is no such evidence, what better way for these men of faith to settle the matter impartially and fairly than to ask the gods to reveal the truth?”

Also partly related to “doubtful matters” may be the additional verse found in some *Nārada* manuscripts: “An ordeal is the mode of proof for a transaction in a forest, in a deserted place, at night, inside a house, or for violence, or denial of deposit” (Lariviere 2003: 331).

Again from the *Nāradaśmṛti* (the last chapter of the “Addenda”¹⁰ that exclusively deals with ordeals) are these clear indications of “doubtful matters”: “no witness” (*yadā sāksī na vidyate*, Nā 20.1) or twice “in doubtful matter(s)” (*saṁdigdhe ‘rthe*, Nā 20.5, and *saṁdigdheṣu*, Nā 20.7).

Finally, an example from Pi 29: “Wherever in a lawsuit the existence of witnesses is not [possible] ordeals are to be given, especially for violent crimes” (*yasmin yasmin vivāde tu sāksīṅāṃ nāsti saṁbhavaḥ sāhaseṣu viśeṣena tatra divyāni dāpayet*). Here, “doubtful matters” and “serious offences” are both mentioned as prerequisites.

E. Rituals

Ritual formulas used in ordeals are mentioned in most major law texts. See, for example, the formulaic verses cited in subsections A and B. In Vi 10.10, we find an invocation for the balance ordeal that also reflects “doubtful matters”: “You are called ‘Balance’, a word synonymous with Law. Only you, O balance, know what humans cannot discern.” In LL (144, 321), we find some “invocations of *dharma*” (*dharmāvāhana*) like “*Dharma* wins, not *adharmā*, truth wins, not untruth, forbearance wins, not anger, Viṣṇu wins, not the demons” (*dharmo jayati*

⁹ The feature of “doubtful matters” seems to be in line with an observation made by the theoreticians of religion Stark/Finke (2000, p. 90): “Humans will not have recourse to the supernatural when a cheaper or more efficient alternative is known and available.”

¹⁰ The reader is invited to consult Lariviere (2003: 7 ff.) if he needs any further information on how ordeals were part of, or added to, the “original” *Nāradaśmṛti*.

nādharmah satyaṃ jayati nānṛtaṃ / kṣamā jayati na krodho viṣṇur jayati nāsurāḥ).

The rituals extend beyond these formulas. For the balance ordeal (which is itself the archetype of all classical Indian ordeals), DT 163.8-175 contains detailed descriptions, a part of which we now cite:

163

... ⁸The chief judge, a brāhmaṇa who has fasted, bathed, etc., should inquire about the matter and he should sift the evidence. Then, after he has weighed the accused and removed him from the balance, he should invoke Dharma, etc. ⁹After having uttered the mantra beginning “OM, that truth ...” and having honored the three brāhmaṇas with sandal-paste etc., he should have each of the three brāhmaṇas say three times in the examination of so-and-so “Good day !”, “Good health !”, and “Prosperity !” –this applies to the performance of any ordeal; he should honor four brāhmaṇas and four ṛtviks with such things as water for washing feet, and then he should request that they perform the offerings which are subsidiary to the ordeals. ...

164

... ²To the east of the balance he should offer to Indra. ³To the south –to Yama. ⁴To the west –to Varuṇa. ... ¹⁰In the region to the south of Indra he should make the offerings to each of the eight Vasus by name ...

165 ...

166 ...

167

... ¹³Then the śodhya, having fasted and wearing wet clothes should be placed in the west scale, and in the east scale bricks should be placed to counterbalance him. After the balance has been determined to be level –by dropping water on top of the balance beam –he should be made to get down. ¹⁴Then, using ink made that day from collyrium of uniform quality, etc., the chief judge should write in two lines of equal length:

168

“The Sun, the Moon, the Wind, the Fire, the Sky, the Earth, the Waters, the Heart, the god of Death, the Day, the Night, the Sunrise and the Sunset, as well as Dharma know the acts of man.” [Pi 78]

¹He should write the forty-four syllables of this mantra on the leaf along with the assertion of the accused that he did or did not do something e.g., “I paid this debt to him” or “I did not borrow this from him”, then he should place the leaf

on the head of the śodhya. ... ³And then the chief judge should invoke the Balance with these words:

169

“O Balance, born of Brahma for the examination of the wicked, you are the embodiment of Dharma (*dhāta*, ‘balance’ and *dharma*) because of your name. [Pi 100]

170 ...

171

“You alone, O God, know what men do not know. This man who is accused in the trial desires to be cleared. [Pi 102]

172

“You ought justly to rescue such a man from this suspicion.” [Pi 102]

...

173

... ¹Then the accused should invoke the Balance:

174

“You, O Balance, are the abode of Truth, you were created by the gods in ancient times. Speak the truth, O Auspicious One, deliver me from suspicion. [Y 2.101]

175

“If I am a sinner, O Mother, then lead me downwards, but if I am pure, then make me rise.” Thus he should address the balance. [Y 2.102]

These quotes very clearly show that ordeals were highly ritualized performances.

F. Non-application for nonbelievers

DT 270 = Pi 43 is quite restrictive about the application of the holy-water ordeal: “The holy water should not be given by the wise to those who drink liquor, nor to women, the dissolute, gamblers, or to those who engage in sacrilegious pursuits” (*madyapastrīvyasaninām kitavānām tathaiva ca kośaḥ prājñair na dātavyo ye ca nāstikavṛttayah*). The last group mentioned in this list clearly points to “non-application for nonbelievers”. Similarly, atheists are excluded from the holy-water ordeal in Nā 20.45 and from any ordeal in DT 42 = K 427.

Thus, the law texts mean to exclude unworthy people from ordeals in general or from specific ordeals. In this context, consider the *Divyatattva* that has a special section entitled *divyaviśeṣādhikāriṇaḥ* (“those who are entitled to particular ordeals”) (Lariviere 1981: 86-93, 164-9). We do not venture a general theory of why specific groups were excluded from specific ordeals. The exclusion of atheists, however, is quite remarkable. After all, God might find out the truth about believers and nonbelievers alike. In the context of Leeson’s theory, the exclusion of nonbelievers is vital because there can be no separation for nonbelievers.

G. *Serious offences*

The requirement of “serious offences” is put expressis verbis in Nā 20.3 (*mahāparādhe divyāni dāpayet tu mahīpatiḥ*). This requirement also clearly shows up in the very beginning of the seventh section of the *Vyavahārādhyāya* of the *Yājñavalkyasmṛti*: In DT 4 = Y 2.95, we read: “The balance, fire, water, poison, and holy water these are the ordeals for purification in this world. These are for serious accusations provided the accuser agrees to undergo punishment” (*tulyāgnyāpo viṣaṃ koṣo divyānīha viśuddhaye mahābhiyogeṣv etani śīrṣakasthe ’bhiyoktari*). For the “agrees to undergo punishment” part, see subsection H below.

In DT 59 = Y 2.99ab, we have a more specific monetary instance of “serious offences”: “For matters of less than 1000 he should not carry the fire, and not the balance, nor the poison” (*nāsaḥasrād dhared agniṃ na tulāṃ na viṣaṃ tathā*). Conflicting figures are analyzed by Lariviere (1981: 22-3).

As seen in subsection D, both “doubtful matters” and “serious offences” are prerequisites in Pi 29. In fact, in serious cases, ordeals should be carried out even if witnesses are present as stipulated in Pi 48.

H. *Agreement by accuser*

Under the heading of “agreement by accuser”, we deal with two closely related requirements: (i) the accuser has to agree to the ordeal, (ii) the accuser has to bear negative consequences in case of the defendant’s clearance. For example, *Nārada* attaches “with the consent of the plaintiff” (*vādino ’numatena*) to every ordeal and stresses *nānyathā* (“not otherwise”), see Nā 20.7.

DT 4 = Y 2.95 lists ordeals that “are for serious accusations provided the accuser agrees to undergo punishment.” In Sanskrit, we have the locative absolute *śīrṣakasthe ’bhiyoktari*. *śīrṣaka* means “head, helmet, verdict”. Thus, *śīrṣakasthe ’bhiyoktari* points to “agreement by accuser”. DT 4.3 offers this

helpful explanation: “The phrase “agrees to undergo punishment” refers to the head, the most important, the crown and fourth part of a legal proceeding wherein the victory, the defeat and the punishment is indicated. He “abides by it” (in this fourth part of the legal proceeding). The meaning of agreeing to undergo punishment is that one partakes in the punishment ordered for the matter under dispute (if he is proved wrong).”

The standard division of labor between undergoing the ordeal and agreement/abiding is given in Pi 52: “The plaintiff is commanded to accept *śiras* in ordeals and the ordeal is to be given to the defendant” (*abhiyoktā śiraḥsthāne divyeṣu parikīrtyate abhiyuktāya dātavyaṃ divyaṃ*)¹¹. In contrast, DT 10 = Y 2.96 allows a reversal of these roles: “Or, at his pleasure, he may make the one undergo the ordeal, and the other undertake the agreement to undergo punishment” (*rucyā vānyatarah kuryād itaro vartayec chiraḥ*).

Lariviere (1984: 35-6) correctly interprets the requirement of “agreement by accuser” as a means to avoid abuses: “It is easy to imagine that the use of ordeals in disputes where no human evidence was available could be particularly susceptible to a variety of abuses. Such things as harassment and intimidation of one party by another in the form of vindictive suits, suing in order to cast doubt on another’s character or acquire some financial gain could easily become rife in a situation where one was freed of having to produce any substantial “human” evidence to prove one’s case. This danger is heightened when one considers the threat of serious injury to the accused who may have to undergo one of the more painful ordeals.”

The requirement “agreement by accuser” is not without exceptions. With respect to ordeals, DT 8 = Pi 38ab+Dhko 462 stipulates: “He should avoid ordeals which do not include the agreement to undergo punishment, but the four ordeals beginning with the balance, as well as the holy water are said to be valid without such an agreement” (*śiraḥsthāyivihīnāni divyāni parivarjayet catvāri tu dhaṭādīni kośaś caivāśirāḥ smṛtaḥ*). Also, some offenses do not require “agreement by accuser” as is evident from DT 10 = Y 2.96: “he may make them undergo an ordeal even without the agreement in cases of treason and sin” (*vināpi śīrṣakān kuryān nṛpadrohe ’tha pātaka*). Lariviere (1981: 8) explains: “Treason means a crime against the king, and one could hardly expect the king to agree to undergo punishment if it should happen that the accused is innocent.” For rationales behind exceptions with respect to “sins”, “implications by thieves”, and “multiple accusers”, see Lariviere (1981: 8 or 1984: 37-8).

¹¹ This translation was suggested, in a personal communication, by David Brick. Vi 9.20-21 says the same thing in similar words: *abhiyoktā vartayecchīrṣaṃ abhiyuktaśca divyaṃ kuryāt*.

IV. The extended Leeson model

In some Indian texts, we find “agreement by accuser” (see subsection III H). This suggests an extended Leeson model where both the defendant and the accuser are free to accept the ordeal or not. The ordeal takes place if both agents agree to it, only. It is undertaken by the defendant as ordained by Pi 52 (see last subsection of section III above). Let us assume that the defendant is innocent and that the accusal is not honest. For the inverse case, the considerations below can be easily adapted.

We distinguish four cases:

- 1) Both the defendant and the accuser agree to the ordeal. Then the ordeal is undertaken. The defendant’s payoffs are those specified in section II. The accuser will be punished if the defendant is cleared, but is able to see his demands fulfilled (for example, he regains his deposit) if the defendant is not cleared.
- 2) The defendant agrees, the accuser does not. In that case, defendant and accuser are treated as if no complaint had been filed.
- 3) The defendant does not agree, but the accuser does. Then, the defendant is punished and the accuser obtains his claim.
- 4) Neither defendant nor accuser agrees. In that case, the defendant is punished while the accuser is neither punished nor does he obtain his claim.

In appendix B, we can show:

The best outcome for each agent is his agreeing to the ordeal while the other rejects the ordeal. In that case, the ordeal does not take place and the agreeing agent obtains the best possible outcome for himself without any risk: The defendant is not punished or the accuser obtains his claim, respectively.

In appendix A, we identify the conditions under which the (innocent) defendant is ready to undergo the ordeal (i.e., to agree to it even if the accuser agrees). In appendix B, we show that the guilty accuser agrees to the ordeal even if the defendant agrees, whenever the claim he hopes to obtain (if the defendant is not cleared) is large relative to the punishment he fears (if the defendant is cleared). Also, the guilty (!) accuser tends to risk the ordeal if ordeals are not seriously believed in and/or if the acquittal probability is low.

Finally, appendix B makes theoretical predictions on how the agents will behave. We obtain the typical outcome according to which one agent agrees to the ordeal while the other does not. Then, the ordeal does not take place, contributing to ordeals being applied in rare cases, only.

Both agents agree to the ordeal (which is then carried out) if the ordeal punishments for the agents are relatively small. Also, the defendant tends to agree to the ordeal if his belief is strong and the acquittal probability large. In contrast, the accuser tends to agree if both belief strength and acquittal probability are low. Summarizing, the chances for ordeals actually taking place are slim if both defendant and accuser have to agree.

Against the above static model, one may argue that the defendant would typically be asked to agree to the ordeal before the accuser. According to our knowledge, there is no clear textual evidence that would support this sequence, but it is certainly quite plausible. If the defendant declined, the plaintiff's willingness was never addressed and the trial proceeded directly to sentencing. Then, the fourth case above could be excluded. As appendix B shows, if both the defendant and the accuser prefer not to see the ordeal performed, the defendant 'wins' in the following sense: The defendant can safely agree to the ordeal because he foresees that the accuser will decline.

V. Conclusion

Just proclaiming to tell the truth is often not sufficient. Ordeals were a more powerful method of underlining the statements of people hoping to find trust. The modern-day expression "cross my heart and hope to die" is a poor substitute, not as convincing as God's own punishment (even if "stick a needle in my eye" is added).

In this article, we present early Indian and medieval Indian texts that do, by and large, support Leeson's theory of ordeals. Many important law texts have some sections on ordeals. Notable exceptions are the *dharmasūtras* of *Gautama*¹², *Baudhāyana*, and *Vasiṣṭha* and also the *Arthaśāstra*. Referring to the latter, Lariviere (1981: 11) is not prepared to think that ordeals were not used in Kautilya's time: "It may only mean that they were not included in the authoritative "codes" as a mode of proof which could legitimately be used to settle a dispute before the king." Indeed, we do not need to go back in time very far: Schlagintweit (1866: 4-5) reports Indian and other cases of ordeals in the late 18th century and mid 19th century and Lariviere (1981: 42) has evidence of ordeals being carried out in the 20th century.

The question of "how ordeals work" has not, as yet, been answered in a satisfactory manner. Lariviere (1981) briefly tells us that they worked because all the agents concerned believed in them. Physiological explanations à la Derrett

¹² In fact, *Gautama* is an unclear case as the discussion by Lariviere (1981: 1-4) shows.

(1978) are simply unconvincing. The current author (being an economist himself) surely likes Leeson's theory much better. One may also point out that the assessment of institutions is a matter of comparisons. In a case study of ordeals in modern-day Liberia, Leeson and Coyne (2012) argue (i) that Liberian governmental judicial institutions are very defective and (ii) that informal methods (like the poison ordeal called "sassywood") may well be a superior institution. However, Indian ordeals were part of the formal judicial framework so that the Indian case does not resemble the Liberian one.

It is easy to overstate the difference between Lariviere (both ordeal administrator and ordeal taker are believers) and Leeson (the ordeal administrator manipulates the ordeal he does not necessarily believe in). Leeson (2012: 698, fn. 23) stresses that "priestly manipulation of ordeals is not incompatible with priestly faith in ordeals as genuine *iudicia Dei*. According to the developing doctrine of *in persona Christi*, priests may have believed that they were acting in the person of Christ—that is, that God was guiding them—when they manipulated ordeals." Also, changing the odds in favor of the ordeal takers could have been a long process already observed by Stenzler (1855: 669). A related point is obvious from the belief and success dynamics sketched by Leeson (2012: 701-4): ordeal administrators who change success probabilities do not necessarily fully understand what the effects might be if they make ordeals easier or harder to pass.

We would like to make one important interpretational point. In section II, we have used the probability that ordeals are *iudicia Dei* (this probability is denoted by ρ in appendix A) in our argument. However, we (or the agents deciding on an ordeal) could have chosen another interpretation without changing the formal model. According to this alternative interpretation the priest may come up with the correct judgement with a certain probability. This correct judgement may reflect the priest's understanding of the conflict and of the people involved. In any case, it is likely that the priest's assessment of the situation may feed into the ordeal's outcome.¹³

Somewhat related to the previous point, Richard Lariviere (in a personal communication) argues that "correctness" of the ordeal may have to be more broadly understood: "A known rogue might be punished by the court not for the crime he is accused of, but for his long-standing reputation as a bad actor. In that context, the "correct" outcome of an ordeal is not in question. That is, even if a witness in the audience secretly knew that the accused is not guilty of the crime he is being tried for, the fact that the ordeal found him guilty is easily explained by some unknown karmic factors that made him "deserve" to be found guilty and thus punished." This interesting observation provides additional support to Leeson's thesis. Indeed, the reputation of individuals may well be known to the

¹³ A similar observation is made by Leeson and Coyne (2012: 617) with respect to the Liberian "sassywood" ordeal.

priests who manipulate the ordeal in line with that reputation.

In another paper, Leeson (2011) suggests an economic analysis of “trial by battle” used to settle unclear land disputes. In this nearly 1000-year-old English institution, representatives of the opponents fought against each other. The winning party obtained (or kept) the contested land. One can see trial by battle as a particular form of ordeal where God is on the side of the honest party. However, in contrast to clergy-organized ordeals, the important point of trial by battle seems to have been the money invested to hire promising champions.

In our paper, we present Leeson’s decision model and the extended game model. The latter is needed when we turn to standard ordeals in the presence of “agreement by accuser”. In contrast, the decision model can be applied to standard ordeals without this requirement and also to restorative ordeals as defined by Brick (2010). It seems that the ordeal taker wishing to restore his social status had to pay for both good and bad outcomes (see also Lariviere 1981: 32). As in the standard ordeal, but for different reasons, the non-ordeal punishment (social status lost) is smaller than the ordeal punishment (social status lost and payment for ordeal performance). See appendix C for a few hints on how to proceed formally.

We close by mentioning the most famous of ordeals, the one that Sītā, Rāma’s wife, undergoes after her liberation (compare, for example, Shastri 1959: 334-42). The accuser is her husband Rāma who accuses her of not having been faithful to him. In order to clear herself from this accusation, she undertakes a fire ordeal. As argued by Brick (2010: 36-7), Sītā’s ordeal is close to a restorative one (although, presumably, she did not need to pay for the performance). It consists of a pyre put up by Rāma’s brother Lakṣmaṇa on Sītā’s request and with Rāma’s consent (Shastri 1959: 337). Sītā is rescued by divine intervention. However, there are no negative consequences for the wrongful accuser. Rāma explains his accusal in these words: “Had I not put the innocence of [Sītā] to the test, the people would have said: - ‘Rama, the son of Dasaratha is governed by lust!’ It was well known to me that Sita had never given her heart to another ...” (Shastri 1959: 341-2). Thus, in contrast to ordeals in the *dharma* texts, both defendant and accuser can come out winning. This story from the very popular *Rāmāyaṇa* epic might well have contributed to increasing the belief in ordeals (restorative or standard) and to making separating outcomes possible.

Appendix A: Leeson's theory

By $NOP > 0$ we denote the non-ordeal punishment and by $OP > NOP$ the ordeal punishment.

Assume that the defendant has partial belief in the ordeal only. His beliefs are described by two probabilities. First, ρ stands for the probability that God reveals the innocence or guilt (in a perfect manner, of course). If the ordeal's outcome is not due to God's revelation (with probability $1 - \rho$), the accused assumes that the ordeal's officer (often a priest) determines the outcome by chance and acquits with probability α .

Assume, now, that the accused is innocent. He will choose the ordeal if

$$\rho \cdot 0 + (1 - \rho)\alpha \cdot 0 + (1 - \rho)(1 - \alpha) \cdot OP < NOP$$

i.e., if

$$(1) \quad \frac{NOP}{OP} > (1 - \rho)(1 - \alpha)$$

For the innocent defendant, the ordeal is attractive if **NOP** is relatively large, **OP** is small, the ordeals are thought to be *iudicia Dei* with a large probability and the acquittal probability (irrespective of guilt) is large.

Let us now turn to the guilty accused. He prefers not to undergo the ordeal if

$$\rho \cdot OP + (1 - \rho)\alpha \cdot 0 + (1 - \rho)(1 - \alpha) \cdot OP > NOP$$

i.e., if

$$(2) \quad \frac{NOP}{OP} < \rho + (1 - \rho)(1 - \alpha)$$

The ordeal separates the guilty (who decline the ordeal) from the innocent (who choose to submit to it) if both (1) and (2) hold, i.e., if

$$(3) \quad (1 - \rho)(1 - \alpha) < \frac{NOP}{OP} < \rho + (1 - \rho)(1 - \alpha)$$

Thus, the larger the probability ρ (the probability for a true revelation of the guilt by God), the easier it is to find a punishment ratio NOP/OP that makes the ordeal work. If there is no belief in the revelation of guilt, we have $\rho = 0$ and the innocent and guilty choose in the same manner.

Keeping the punishments and the belief in ordeals ρ constant, one can ask the question of how to fix the acquittal probability α at a level that makes the ordeal

separating. Leeson (2012: 700) presents two inequalities in terms of the acquittal probability.¹⁴ It seems to us that Leeson makes a mistake at this juncture. α is the conditional probability for acquittal, given that the ordeal is not a divine institution, from the accused's point of view. It should not be equated with the "probands' historical success rate" (Leeson 2012: 700).¹⁵

Here is how the success rate that we denote by σ is related to α . The ordeal taker's model of how God and the ordeal organizer produce a judgement has to be consistent with the data observed by the ordeal taker. From the ordeal taker's point of view, innocent ordeal takers are cleared with probability $\rho + (1 - \rho)\alpha$ while guilty ordeal takers are cleared with probability $(1 - \rho)\alpha$. Let γ be the percentage of guilty ordeal submitters, again based on the ordeal taker's subjective estimate. Then (in the long run, in equilibrium), the historical success rate σ should equal (or be close to) the success rate the ordeal taker can expect from his beliefs:

$$(4) \quad \sigma = \gamma[(1 - \rho)\alpha] + (1 - \gamma)[\rho + (1 - \rho)\alpha] = (1 - \rho)\alpha + \rho(1 - \gamma)$$

As argued above, $\rho = 1$ implies $\gamma = 0$ and then we get $\sigma = 1$ immediately. Inversely, consider the special case of $\sigma = 1$. It implies one of three cases:

- $\alpha = 1$ (very benevolent officer) and $\gamma = 0$ (guilty defendants do not submit to ordeal)
This first case is unlikely. If the officer is very benevolent, some guilty defendants will hazard the ordeal.
- $\alpha = 1$ (very benevolent officer) and $\rho = 0$ (ordeals not *iudicia Dei*)
Here, every defendant (even the guilty ones) can be sure to succeed. This is not a separating situation.
- $\gamma = 0$ (guilty defendants do not submit to ordeal) and $\rho = 1$ (ordeals *iudicia Dei*)
In this last case, ordeals are believed to be *iudicia Dei*.

Turning away from the extreme cases with 100% success rate, Leeson (2012: 702) observes that $\sigma < 1$ means an imperfect ordeal in the following sense. While the ordeal may still separate (in line with inequalities (3)), some innocent defendants (the fraction $1 - \sigma$) will be considered guilty.

Reconsider the above condition (4). We find: Keeping all other variables constant, the acquittal probability α is a positive function of the success ratio by

¹⁴ In terms of our variables, they read $\frac{1-\rho-\frac{NOP}{OP}}{1-\rho} < \alpha < \frac{1-\frac{NOP}{OP}}{1-\rho}$.

¹⁵ See also p. 702 where the acquittal probability is addressed as "the proportion of probands condemned in their community".

$$(5) \quad \alpha = \frac{\sigma - \rho(1-\gamma)}{1-\rho}$$

Then, by increasing the success ratio σ the officer can induce people to assume a higher acquittal probability α . By (1) and (2), the defendants then tend towards ordeal taking. Theoretically, the strength of this effect (how σ influences α) positively depends on ρ (the belief in *iudicia Dei*). (5) seems to be the reason why many qualitative results derived by Leeson continue to hold in spite of his confusing α and σ .

Appendix B: Extending the Leeson model

We consider the extended Leeson model for an innocent defendant and a dishonest accuser. (We briefly comment on the inverse situation below.) The defendant's payoffs are 0 , OP_D , or NOP_D . He obtains 0 (i.e., is not punished) if he is cleared in the ordeal or if he agrees to undergo the ordeal while the accuser declines. NOP_D is the defendant's non-ordeal punishment that occurs if the defendant does not agree to submit to the ordeal. Finally, we have the OP_D punishment if the defendant undergoes the ordeal and is not cleared.

We now turn to the accuser's payoffs which can be 0 , OP_A , or C_A . We assume that the accuser has zero payoff if he does not agree to the ordeal (which consequently does not take place). The accuser can push his claim through and obtain the payoff $C_A > 0$ if he agrees to the ordeal while the defendant does not or if the ordeal takes place and the defendant is not cleared. Finally, the accuser suffers the payoff $-OP_A < 0$ (OP_A stands for ordeal-punishment for accuser) if the ordeal shows that the accusation was wrong.

Thus, we have the following four cases:

- 1) Both the defendant and the accuser agree, and payoffs (the defendant's payoff is the first entry, the accuser's payoff the second one) are

$(0, -OP_A)$ in case of clearance
 $(-OP_D, C_A)$ in case of non-clearance

- 2) The defendant agrees, the accuser does not, and payoffs are

$(0,0)$

- 3) The defendant does not agree, but the accuser does, and payoffs are

$$(-NOP_D, C_A)$$

4) Neither defendant nor accuser agrees.

$$(-NOP_D, 0)$$

Let us deal, first, with the defendant's perspective. If the accuser does not agree to the ordeal, it is best for the defendant to agree because he can then make sure not to be punished. If, however, the accuser agrees to the ordeal, the defendant is in the situation of section II (appendix A) and will agree to the ordeal if

$$(1) \quad \frac{NOP_D}{OP_D} > (1 - \rho)(1 - \alpha)$$

holds.

We now turn to the accuser. If the defendant does not agree to the ordeal, the accuser should agree and secure $C_A > 0$ for himself. If the defendant agrees, the declining accuser earns a zero payoff. If, instead, the accuser risks the ordeal outcome, he obtains the payoff $-OP_A < 0$ if the defendant is cleared, but wins $C_A > 0$ if the defendant is proclaimed guilty.

Since the innocent (!) defendant is cleared with probability $\rho + (1 - \rho)\alpha$, the accuser prefers to risk the ordeal if

$$[\rho + (1 - \rho)\alpha] \cdot (-OP_A) + [1 - \rho - (1 - \rho)\alpha]C_A > 0$$

i.e., if

$$(6) \quad \frac{C_A}{OP_A} > \frac{\rho + (1 - \rho)\alpha}{1 - \rho - (1 - \rho)\alpha} = \frac{1}{(1 - \rho)(1 - \alpha)} - 1$$

Thus, the accuser tends not to risk the ordeal if the agents strongly believe in the ordeal (high ρ) or, in case they do not believe, assume a high acquittal probability α .

We now check for dominant strategies and Nash equilibria (for these concepts, consult Gibbons 1992: 1-12). A dominant strategy is a best strategy irrespective of the other player's strategy. A Nash equilibrium is a condition for stability. Each agent can choose the strategy "agree to the ordeal" or "do not agree to the ordeal". Thus, we arrive at four strategy combinations corresponding to the four

cases above. A strategy combination consists of a strategy for each player, for example (defendant agrees, accuser does not agree). A particular strategy combination is called a Nash equilibrium if no agent can profit from deviating unilaterally. Thus, the strategy combination (defendant agrees, accuser does not agree) is a Nash equilibrium if the defendant is not better off at the strategy combination (defendant does not agree, accuser does not agree) and if the accuser is not better off at the strategy combination (defendant agrees, accuser agrees).

We distinguish four situations¹⁶:

- i. (1) and (6) hold
By (1), the defendant will always agree irrespective of what the accuser does. Game theorists call the strategy “agree” on the defendant’s side a dominant strategy. By (6) the accuser also has “agree” as a dominant strategy. In game theory, the strategy combination (agree by defendant, agree by accuser) is called a Nash equilibrium.
- ii. (1) holds and (6) does not
The defendant has “agree” as a dominant strategy. Given that strategy, the accuser should not choose to agree since his win/punishment ratio given in (6) is lower than the right-hand side. We obtain the Nash equilibrium (agree by defendant, disagree by accuser).
- iii. (1) does not hold and (6) holds
The accuser agrees to the ordeal and hence the defendant does not agree. The Nash equilibrium is (disagree by defendant, agree by accuser)
- iv. (1) does not hold and (6) does not hold
Here we have two possible outcomes. Imagine that the defendant does not agree to the ordeal. Then, the accuser is happy to agree. Given that the accuser agrees, the defendant prefers not to agree. Thus (disagree by defendant, agree by accuser) is a Nash equilibrium. The inverse equilibrium (agree by defendant, disagree by accuser) also exists. Thus, we have two equilibria in this case.

We now turn to the sequential model where the defendant has to announce his agreement first. As indicated in the main text, the game tree is as follows: At the first stage, the defendant chooses between “agree” and “do not agree”. If the defendant agrees, the plaintiff also chooses between “agree” and “do not agree” at the second stage. If the defendant does not agree at the first stage, the game is over and payoffs are as in 3).

We assume that the plaintiff will choose a best action and that the defendant foresees that action. This amounts to applying ‘backward induction’ (see, for example, Gibbons 1992: 55-61). We obtain these backward-induction outcomes:

¹⁶ We assume strict inequalities and disregard equalities. This is justified by the fact that (in some sense that could be made precise) the chances for equality are zero.

- i. (1) and (6) hold
The defendant agrees although he foresees that the accuser will also agree.
- ii. (1) holds and (6) does not
The defendant agrees and foresees that the accuser will decline.
- iii. (1) does not hold and (6) holds
The defendant foresees that the accuser would agree if asked. Therefore, the defendant declines and the accuser's agreement is not addressed.
- iv. (1) does not hold and (6) does not hold
The defendant foresees that the accuser will decline if confronted with agreement by the defendant. Therefore, the defendant will indeed agree to the ordeal.

So far, we have assumed an innocent defendant. We now turn to the opposite case where the defendant is guilty and the accuser honest. The derivation is pretty much the same as above, except for the inequalities (1) and (6). If the accuser agrees to the ordeal, appendix A shows that the defendant will agree to the ordeal if

$$(2) \quad \frac{NOP_D}{OP_D} > \rho + (1 - \rho)(1 - \alpha)$$

holds.

The guilty defendant is cleared with probability $(1 - \rho)\alpha$ and the accuser prefers to risk the ordeal if

$$(1 - \rho)\alpha(-OP_A) + [1 - (1 - \rho)\alpha]C_A > 0$$

i.e., if

$$(7) \quad \frac{C_A}{OP_A} > \frac{(1 - \rho)\alpha}{1 - (1 - \rho)\alpha}$$

Thus, the accuser tends to risk the ordeal if the agents strongly believe in the ordeal (high ρ) or assume a low acquittal probability α . The analysis of dominant strategies, Nash equilibria, and backward-induction outcomes proceeds as above – we only need to replace inequalities (1) and (6) by inequalities (2) and (7), respectively.

Appendix C: Leeson's theory for restorative ordeals

We now adapt appendix A so that restorative rather than standard ordeals can be dealt with. Basically, we need to replace the payoff 0 (for being found innocent in standard ordeals) by PC (for not losing the social status, but incurring the performance cost). Note that these costs are also included in OP both in appendix A and here in appendix C.

If the accused is innocent, he will choose the restorative ordeal if

$$\rho \cdot PC + (1 - \rho)\alpha \cdot PC + (1 - \rho)(1 - \alpha) \cdot OP < NOP$$

i.e., if

$$(8) \quad PC < \frac{NOP - (1 - \rho)(1 - \alpha) \cdot OP}{\rho + (1 - \rho)\alpha}$$

The guilty accused prefers not to undergo the ordeal if

$$\rho \cdot OP + (1 - \rho)\alpha \cdot PC + (1 - \rho)(1 - \alpha) \cdot OP > NOP$$

i.e., if

$$(9) \quad PC > \frac{NOP - [\rho + (1 - \rho)(1 - \alpha)] \cdot OP}{(1 - \rho)\alpha}$$

Separation of ordeal takers (into those who deserve and those who do not deserve to have their social status restored) occurs if both (8) and (9) hold.

Abbreviations

DT	Divyatattva (see Lariviere 1981)
LL	Lekhapaddhati-Lekhapañcāsika (see Strauch 2002)
Nā	Nāradaśmr̥ti (see Lariviere 2003)
Pi	Pitāmahaśmr̥ti (see Scriba 1902)

References

- Brick, David (2010). The Court of Public Opinion and the Practice of Restorative Ordeals in Pre-Modern India, in: *Journal of Indian Philosophy*, Vol. 38, 25-38.
- Derrett, J. Duncan M. (1978). Ancient Indian ‘Nonsense’ Vindicated, in: *Journal of the American Oriental Society*, Vol. 98, 100-106.
- Gibbons, Robert (1992). *A Primer in Game Theory*, Harvester Wheatsheaf (New York).
- [Nā] Lariviere, Richard W. (2003). *The Nāradaśmr̥ti. Critical Edition and Translation*. Motilal Banarsidass Publishers (Delhi).
- [DT] Lariviere, Richard W. (1981). *The Divyatattva of Raghunandana Bhaṭṭācārya: Ordeals in Classical Hindu Law*. Manohar (Delhi).
- Lariviere, Richard W. (1984). An Institution Designed to Control Potential Abuses of Ordeals in Classical Hindu Law: The Śiraḥ, in: *Journal of the Oriental Institute of Baroda*, Vol. 34, 35-39.
- Leeson, Peter T. (2011). Trials by Battle, in: *Journal of Legal Analysis*, Vol. 3, 341-375.
- Leeson, Peter T. (2012). Ordeals, in: *Journal of Law and Economics*, Vol. 55, 691-714.
- Leeson, Peter T./Coyne, Christopher J. (2012). Sassywood, in: *Journal of Comparative Economics*, Vol. 40, 608-620.
- Olivelle, Patrick (2000). *Dharmasūtras. The Law Codes of Āpastamba, Gautama, Baudhāyana, and Vasiṣṭha*. Motilal Banarsidass Publishers (Delhi).

Olivelle, Patrick (2005). *Manu's Code of Law*. Oxford University Press (Oxford et al.).

Olivelle, Patrick (2009). *The Law Code of Viṣṇu*. Harvard University Press (Cambridge).

Patkar, Madhukar M. (1978). *Nārada, Bṛhaspati and Kātyāyana. A Comparative Study in Judicial Procedure*. Munshiram Manoharlal Publishers (Delhi).

Schlagintweit, Emil (1866). *Die Gottesurtheile der Indier*, Verlag der königl. Akademie (München).

Shastri, Hari Prasad (1959). *The Ramayana of Valmiki*. Shanti Sadan (London).

[Pi] Scriba, Karl (1902). *Die Fragmente des Pitāmaha. Text und Übersetzung*, Dissertation Julius-Maximilians-Universität zu Würzburg. Druck von W. Dru-gulin (Leipzig).

Stark, Rodney/Finke, Roger (2000). *Acts of Faith*. University of California Press (Berkeley).

Stenzler, Adolf Friedrich (1855). *Die indischen Gottesurtheile*, in: *Zeitschrift für die deutsche morgenländische Gesellschaft*, Vol. 9, 661-683.

[LL] Strauch, Ingo (2002). *Die Lekhapaddhati-Lekhapañcāśika. Briefe und Ur-kunden im mittelalterlichen Gujarat*. Reimer Verlag (Berlin).