SHORTER NOTES

DIKASTIC PARTICIPATION*

In the fourth century B.C.E., Athens ran a very elaborate judicial system based on popular participation. Members of each law court were chosen through a lottery system. Partly judicial system, partly source of popular entertainment, partly economic redistribution mechanism – the judges each got three obols a day to serve – the courts were in some ways Athens' most powerful political institution, even more powerful than the popular assembly. But how many judges participated on a regular basis?

The courts ranged in size from the 201 and 401 *dikastai* ('judges' or 'jury members' or 'jurors'), who decided private disputes, to multiples of 500 (up to 2501), who decided disputes that involved the *polis*.[1] It appears that 500 judges served in the court that condemned the philosopher Socrates to death in 399 B.C.E.[2] Evidence from the fifth century suggests that as many as 6,000 Athenians swore the judges' oath to serve in the law courts each year.[3] There is no direct evidence for how many served in the fourth century, but the number is unlikely to have changed much. For most of the century they were given bronze allotment plates, which appear to have stayed with them through a year of service but which commonly went to new users, as often as five or six times.[4]

The system by which a selection of the 6,000 was chosen for service each day is described in great detail in the *Athenaion politeia* (63.2–5). Each man, who had to be over 30 years of age and free from debts to the *polis*, received an allotment plate (*pinakion*), more or less the size of a tongue depressor, which listed his name, his father's name and his deme.[5] Since each of the demes belonged to one of Athens' ten tribes, the identification of the deme entailed identification of the judge's tribe. Athens' jury pool of *c.* 6,000 was thus divided into ten more or less equal units of 600 according to the ten tribes, and each tribe had its own entrance to the judicial complex.

The allotment plate also had a letter, from α to κ (1 to 10), which further divided the *dikastai* into ten groups (*Ath. pol.* 63.4). The result of the tribal and letter divisions was that the 6,000 judges were divided equally into 100 groups of

* Our thanks are due to the anonymous reader for *CQ*, several of whose thoughtful queries have been incorporated into the article.

[1] *Ath. pol.* 53.3, 68.1. See also M.H. Hansen, *The Athenian Democracy in the Age of Demosthenes* (London, 1999²), 187.

[2] Cf. Pl. *Ap*. 36a, a passage that also presents an interesting problem of computation.

[3] Ar. *Vesp*. 662; Andoc. 1.17; *Ath. pol.* 24.3.

[4] See J.H. Kroll, *Athenian Bronze Allotment Plates* (Cambridge, MA, 1972), and idem, 'More Athenian bronze allotment plates', in K. Rigsby (ed.), *Studies Presented to Sterling Dow on his Eightieth Birthday* (Durham, NC, 1984), 165–71.

[5] The *Ath. pol*. 63.4 says that the *pinakia* were made from boxwood in its time.

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60. On a given day, each of the 100 groups had to be represented equally in the courtrooms. The *Athenaion politeia* tells us that the Athenians used devices known as *kleroteria* to help with the sorting.[6] Each tribe had two *kleroteria* with columns α to κ, and each *kleroterion* thus sorted 5% of the judges.

Say that one day 1500 judges are needed: they might fill one court of 201, two courts of 401 and one court of 501 judges. The 'one' judge among the 201, 401 and 501 seems to have been the presiding magistrate, who thus apparently did not participate in this lottery process, but there was another lottery, which assigned the magistrates to the various courts sitting that day (*Ath. pol.* 66.1).[7] The twenty *kleroteria* will obviously have only been able to sort multiples of twenty. In order for the lottery procedure to be effective, multiple courts, sitting simultaneously, seem to have been necessary,[8] and the courts hearing private cases certainly heard more than one case in a day. For there to be 1,500 judges available for the lottery, there must have been at least 15 judges present from each of the 100 groups.

Clearly not all 6,000 judges need to show up in order to ensure that there are at least 15 from each of the 100 groups. It is barely possible that only 1,500 judges would be needed; they would happen to show up in equal numbers from each of 100 groups. It is also barely possible that, with as many as 5,954 judges present, one of the groups would have only 14 present.

This type of problem is generally called an 'occupancy problem' and has a venerable history in statistics.[9] The exact computations are long and tedious, but it is much easier to get an 'approximate' answer via simulation. Based on 1,000 such simulations it appears that *approximately* 2,650 *dikastai* appearing for service would fill the 15 necessary rows on all the *kleroteria* 95% of the time.[10] Something like that level of surety would seem to have been needed in order to make the system work.

The number of judges needed to be reasonably certain that all 100 groups have at least 15 judges is computed using a simulation as follows. In each run of the simulation, the number of judges in each group is set to 0 and 6,000 judges are assumed to be ready to arrive, with membership divided equally among the 100 groups (60 members for each group). Each new judge who arrives is assumed to do so at random from the judges who have not yet arrived. As a judge arrives, his group membership is used to assign him to the jury pool in that group. After each arrival, each jury pool is checked to see if the minimum 15 members are present in all groups. If at least one group has less than the minimum members present, another judge is selected at random to arrive. This is repeated until every group has the minimum members present and the total number of judges who arrive is recorded.

This simulation was repeated by us 1,000 times and each simulation gave the number of judges needed to arrive to ensure that every group had at least 15

[6] See S. Dow, 'Aristotle, the *kleroteria* and the courts', *HSPh* 50 (1939), 1–34.

[7] Cf. P.J. Rhodes, *A Commentary on the* Athenaion politeia (Oxford, 1993), 729.

[8] Hansen (n. 1), 187, says that, on a given day, all the courts had to be the same size; there seems no reason for this restriction. Cf. Rhodes (n. 7), 714–15.

[9] C. Taylor, 'From the Whole Citizen Body? The Sociology of Election and Lot in the Athenian Democracy', *Hesperia* 76 (2007), 323–45, has recently made use of another statistical application, the chi-square test, to evaluate the distribution of office holders by deme in Athens.

[10] We say 'approximately' because each time the 1,000 simulations are run slightly different results occur. One time the 95th percentile was achieved with 2657, another time with 2647.

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members. These values were sorted, and the 50th (median) and 95th percentile were found. The median percentile would be interpreted as the minimum number of judges that need to arrive to be 50% certain that all groups have at least 15 members; the 95th percentile is interpreted as the minimum number of judges that need to arrive to be 95% certain that all groups have at least 15 members. The key assumption is that judges arrive at random. If judges in Athens did not arrive at random (for example, members from the same tribe might have tended to travel together), this simulation may not be valid, but it would be impossible to estimate the number of judges needed unless the pattern of non-random arrival were also modelled.

What would happen if there were enough jurors present for the needs of the day, but they were not divided equally among the tribes and groups? Must we assume that the Athenians would wait until enough jurors from each group arrived? Or should we suppose that the purpose of the system was to avoid corruption and to select the necessary number of jurors in a democratic and impartial way if there were more jurors present than necessary, but that the Athenians would be flexible with the system if they just had the necessary number present? One might suppose, for instance, that, in that case, if there were more jurors present from a particular tribe or letter group, they would simply select more jurors from that particular group. Unfortunately we have no evidence to answer such questions. *Ath. pol.* is silent even on the possibility of it. However, if we assume – and no one doubts it – that the fourth-century jury pool was 6,000, then it was certainly large enough to accommodate this system. The 6,000 would all have expressed their interest (and availability) to serve on the *dikasteria*, so we can safely assume that they offered themselves often enough to make the system work. Somewhat fewer than half of them would need to offer themselves in order to have 1,500 judges.

Why 1500 judges? The model that we investigated represents one *dikasterion* of 200 judges, two of 400 each, and one of 500. On another day perhaps only 1,000 are needed – say three *dikasteria* of 200 and one of 400. Would the same ratio, for example 1500/2657, apply? In fact, no. A smaller number of judges needed would require a higher proportionate number of potential *dikastai* offering themselves. We have run simulations for various numbers, based on the occupancy problem and the same system of ten tribes and ten letter groups. If 1,000 judges were needed, approximately 2,100 would be needed to achieve 95% certainty of filling the spaces; if 2000, approximately 3,200 would be needed. For smaller numbers of judges, the ratio is larger (but based on smaller minimum levels). For example, if only five people are needed in each group (500 total), the ratio to be 95% confident is about 2.9, or $2.9 \times 5 \times 100 = 1450$ people, rather than the bare minimum of 500. The ratio levels off as the minimum increases. The reason for this is related to the law of large numbers: larger sample sizes behave more regularly.[11]

On the day when 1,500 *dikastai* are needed, at least 1150 jurors (i.e. about 40% of those present) are likely to have gone without the dicastic pay, a very significant number of men. What sort of people would wake up early to go to the court when there was a significant chance that they would not be selected for the day? How would these people then make up for the lost day's salary? Or is pay

[11] For example, if you flip a coin 10 times, it is quite reasonable (95% confident) that you will get between 2 and 9 heads. If you flip it 1000 times, it is quite reasonable (95% confident) that you will get between 470 and 530 heads, a much narrower range of values.

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irrelevant? What are the implications for the social background and aspirations of the jurors?

Adriaan Lanni points to one implication of there being so many prospective judges who were not empanelled: they became spectators.[12] Aristophanes' *Wasps* 303–11 suggests that many of the prospective judges did not have any other employment to go to. For some, not being selected might cause real economic hardship. But, for the period described in the *Ath. pol.*, if there were 6,000 citizens empanelled to serve as *dikastai* each year, they knew that their chances of serving on any given day were only one in three or four (assuming 1500–2000 judges serving daily). If they actually showed up, their chances could jump to more like three or more out of five, the chances being higher the larger (and probably more noteworthy) the trials were.[13] Regular *dikastai* could budget for getting the triobol pay somewhat more than half the time if they showed up (and not too many more of their colleagues than necessary for the operation of the lottery did). When they did not get it, they got the consolation prize, more choice as to which trial to attend as spectators.

Ath. pol. 64.3 tells us that each of the twenty *kleroteria* had black and white cubes. As many white cubes were used in each *kleroterion* as there were (multiples of five) judges needed, but clearly the total number of cubes used was no more than the number of judges in the shortest column in the *kleroterion*.[14] The reason for the use of the black cubes seems at least twofold. First, introducing the white/black cube system mitigated the potentially malign influence of those responsible for inserting the *pinakia* into the *kleroteria*. With the black cubes randomly eliminating whole rows, there would be no advantage in placing a *pinakion* in one row versus another so long as it was not placed at the very bottom, where it might be below the level of the shortest column and automatically eliminated. The second reason must stem from the fact that different numbers of black cubes could be used in each of the 20 *kleroteria*. It seems likely that cases involving members of one or two tribes may have occasioned a greater turnout among judges from those tribes. Their *kleroteria* would thus be more filled and more black cubes would be used in them, presumably as many as were to fill out the shortest column. The black cubes would serve to ensure that as many as possible stayed, since extras would still have a chance of serving even if a particular tribe had many extra potential *dikastai*. In any case, the use of the black cubes does not appear to alter the statistical elements of the occupancy problem.

It seems a significant fact about the Athenian courts that close to half of those empanelled to serve in a given year would have had to show up on a given day to make the lottery system described in the *Ath. pol.* work effectively. Hansen has argued that the courts could have met as many as 150–200 days a year.[15] With

[12] A. Lanni, 'Spectator sports or serious politics? *οἳ περιεστηκότες* and the Athenian law-courts', *JHS* 117 (1997), 183–9.

[13] In his *Politics*, Aristotle discusses getting the right mixture of rich and poor as judges (4.9.1294a41–b1, 4.14.1298b13–25), but he does not consider the issue of potential judges in a lottery going home without pay. See D.C. Mirhady, 'Aristotle and the law courts', *Polis* 23 (2006), 302–18.

[14] See Rhodes (n. 7), 708–9.

[15] M.H. Hansen, 'How often did the Athenian *dicasteria* meet?' *GRBS* 20 (1979), 243–7; idem (n. 1), 199.

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multiple courts each day and multiple cases heard by each court, that may have pushed the number of cases over a thousand.

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BUILDING FOR THE NYMPHS

Now, exactly this same contemplation of subservience to human use makes the Greek take some pleasure in *rocks*, when they assume one particular form, but one only – that of a *cave*.[1]

South-west of Pharsalus, in one of the cliffs overlooking the southern edge of the Enipeus valley, is an ancient shrine to the Nymphs known as Alogopati or Karapla cave.[2] Information on the sanctuary and its founder survives in two rock-cut inscriptions carved respectively on the east and south walls of the cliff. The text on the east wall, assigned palaeographically to the late sixth/early fifth century B.C.E., contains the dedication of the cave by a certain Pantalces (*SEG* 1, 1923, 247 = *IThess.* 1, 72). The second inscription, of a somewhat later date, is an epigram of twenty hexameters addressed to the visitors of the cave (*SEG* 1, 1923, 248 = *IThess.* 1, 73). The first eight lines of this poem offer a brief but lively overview of the shrine, its cults and its furnishings; I print them below as they appear in the recent edition by J.C. Decourt:[3]

θεός.
χαίρετε τοὶ πᾳ[ριόντες, ἄπ]ᾳ[ς] θῆλύς τε καὶ ἄρσην,
ἄνδρες τε ἠδὲ γυναῖκες ὁμῶς παῖδές τε κόραι τε·
χῶρον δ᾽ εἰς ἱερὸν Νύμφαις καὶ Πανὶ καὶ Ἑρμῆι,
Ἀπόλλονι ἄνακτι, Ἡρακλεῖ καὶ ἑταίραις,
Χίρωνος τ᾽ ἄντρον καὶ Ἀσκλαπιοῦ ἠδ᾽ Ὑγιείας·
τούτων ἐστὶ τ[ά]δ᾽, ὦνα Πάν, ἱαρώτατ᾽ ἐν αὐτῶι
ἔμφυτα καὶ πίνακες καὶ ἀγάλματα δῶρά τε πολλ[ά]·

[1] Ruskin, *Modern Painters*, vol. 3 (London, 1872[3]), 19.

[2] Essential bibliography: N.J. Giannopoulos, '*Ἄντρον Νυμφῶν καὶ Χίρωνος παρὰ τὴν Φάρσαλον*', *BCH* 36 (1912), 668–9; '*Φαρσάλου ἄντρον ἐπιγεγραμμένον*', *AE* (1919), 48–53, pls 1, 3 = *SEG* 1 (1923), 247–8 (with corrections and additional supplements by J.J. Hondius and W. Croenert). D. Levi, 'L'antro delle ninfe e di Pan in Tessaglia', *ASAA* 6–7 (1923–4), 27–42, pls 1–51. F. Stählin, *Das Hellenische Thessalien: Landeskundliche und geschichtliche Beschreibung Thessaliens in der hellenischen und römischen Zeit* (Stuttgart, 1924; repr. Amsterdam, 1967), 144. W. Peek, 'Metrische Inschriften', *Mnemosynon Theodor Wiegand* (Munich, 1938), 18–27, pl. 1. J.C. Decourt, *Inscriptions de Thessalie, I : Les cités de la vallée de l'Énipeus*, Études épigraphiques 3 (Paris and Athens, 1995), 90–4, nn. 72–3, pl. 8, figs 47, 48. J. Riethmüller, *Asklepieia: Heiligtümer und Kulte einer griechischen Heilgottheit*, Studien zu antiken Heiligtümern 2 (Heidelberg, 2001), 293–6, n. 147.

[3] Decourt (n. 2).

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