

Byzantine Heavy Artillery: The Helepolis

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THE MILITARY MANUAL (*Strategikon*) attributed to the emperor Maurice stipulated that the infantry contingents should be followed by a train of wagons, some of which were to transport artillery crews, carpenters, and metal workers, as well as βαλλίστρας ἐκατέρωθεν στρεφόμενας.¹ In his translation accompanying the Greek text E. Gamilscheg rendered this as "Katapulten nach beiden Seiten zu drehen." I put it into English as "revolving *ballistae* at both ends."² I visualized the wagons as mobile fighting platforms with two medium-sized torsion or tension weapons, *ballistae*, which revolved in a horizontal arc, somewhat like pivoting machine guns. "Both ends," though, I am now convinced, refers to the weapon, not the wagon, and the revolving motion must have been vertical, up and down (like a child's seesaw), not horizontal.³ Torsion weapons, such as the *ballista*, do not revolve;

¹ *Das Strategikon des Maurikios*, ed. G. T. Dennis, transl. E. Gamilscheg (CFHB 17: Vienna 1981) 12.B.6.9.

² *Maurice's Strategikon. Handbook of Byzantine Military Strategy*, transl. G. T. Dennis (Philadelphia 1984) 139.

³ It is possible, but unlikely, that the author is referring to the *carroballista* of Vegetius which was mounted on a small horse-drawn cart (*Epitoma rei militaris*, ed. and transl. L. Stelten [New York 1990] 2.25, 3.24), or to the swivelling bolt-projecting catapult, also mounted on a cart, described by the Anonymus, *De rebus bellicis*, ed. R. Ireland (Oxford 1979) 18. But there is no evidence that field artillery of this sort lasted into the sixth century. It is also possible, though again I believe unlikely, that the passage refers to twisting the springs of the two arms of a torsion catapult: E. W. Marsden, *Greek and Roman Artillery: Technical Treatises* (Oxford 1971) 44, 123, 131–135, 169–173.

the *onager*, which pivots from down to up, moves only at one end. The *Strategikon*, I would argue, is not referring to a torsion or tension weapon at all, even though it uses the classical word, *ballista*, but to a more advanced kind of artillery, recently arrived in the Mediterranean world, which was operated by traction, men pulling ropes at one end of a rotating beam to propel a projectile placed in a sling at the other end, thus "revolving at both ends." There was as yet no specific term for this artillery piece, but it later came to be known in the west as *trebuchet* and, as we shall see, very soon in the Byzantine world as *helepolis* (city-taker).

This thesis seems to be confirmed by the *Tactical Constitutions* of Leo VI, compiled at the beginning of the tenth century, and which, to a large extent, was intended to bring previous military manuals into line with contemporary equipment and terminology. According to Leo, the wagons accompanying the infantry were to carry τοξοβολίστρας, that is, torsion or tension weapons, and a supply of bolts. In addition, they were to carry "ballistae or machines called *alakatia* which revolve in a circular manner," βαλίστρας ἥτοι μαγγανικὰ τὰ λεγόμενα ἀλακάτια στρεφόμενα κυκλόθεν (6.27).⁴

The old word, *ballista*, is copied from the *Strategikon* but then further qualified as *alakatia*. This is another generic Byzantine word, ἀλακάτιον, a diminutive of ἡλακάτη, which can designate a distaff or distaff-shaped object, the upper, revolving part of a mast, a windlass, or any staff-like object designed to turn. The μαγγανικὰ ἀλακάτια mentioned by Leo "revolve at both ends, in the two parts, or in a circle," ἐκατέρωθεν, εἰς τὰ δύο μέρη, κυκλόθεν, γύρωθεν.⁵ Clearly, these are stone-throwing machines, πετροβόλα μαγγανικά, which could also launch

⁴Ed. R. Vári, *Leonis imperatoris Tactica, libri I–XIV* (Budapest 1917–1922) 38 (complete in Migne, PG 107.669–1120). On the changing meaning of *ballista* see N. Pétrin, "Philological Notes on the Crossbow and Related Missile Weapons," *GRBS* 33 (1992) 265–291.

⁵5.6, 6.27; *Recensio Const. ad loc.*

incendiary missiles.⁶ The fact that they revolved at both ends or in a circular fashion makes it almost certain that these *alakatia* were trebuchets, very likely pole frame models which could be transported in wagons, quickly assembled, and operated by one or a few soldiers, much as depicted in the illustrated Madrid Skylitzes.⁷ Later, in the tenth century, Nikephoros Phokas ordered that each unit of light infantry was to have access to three of these *alakatia*, along with other portable artillery.⁸

The author of the *Strategikon* does not tell us when this new kind of artillery was introduced into the Byzantine Empire, but the historian of Maurice's reign, Theophylaktos Simokatta, does provide information about when it came into use and what name the Byzantines gave the new weapon. Bousas, a Byzantine soldier captured by the Avars, taught them how to construct a siege machine (πολιορκητικόν τι μηχανήμα), for they were ignorant of such machines (ὀργάνων). And so he prepared the helepolis to shoot missiles: ἀκροβολίζειν ... τὴν ἐλέπολιν (2.16.10).⁹ With this fearsome and skillful device (δαινὸν τεχνούργημα) the Avars attacked many Byzantine cities, leveling the fortress of Appiareia in 587 and ten years later attacking Thessaloniki, which successfully resisted (2.16.11, 2.17.2). Bousas, and other Byzantine artillerymen, therefore, must have learned how to build and operate these weapons some years before 587.

The fear and destruction wrought by these trebuchets, fifty

⁶ 15.27; cf. *Strategikon* 10.1.52.

⁷ Fols. 151, 166, 169: S. Cirac Estopañan, *Skylitzes Matritensis I reproducciones y miniaturas* (Barcelona/Madrid 1965) 357, 369, 371; A. Grabar and M. Manoussacas, *L'illustration du manuscrit de Skylitzès* (Venice 1979) figs. 193, 213.

⁸ 1.15; text in E. McGeer, *Sowing the Dragon's Teeth: Byzantine Warfare in the Tenth Century* (Washington 1995) 20.

⁹ *Theophylacti Simocattae Historia*, ed. C. de Boor (Leipzig 1887) 102–103.

of which were deployed against Thessaloniki, is vividly described in the *Miracula S. Demetrii*:¹⁰

These were tetragonal and rested on broader bases, tapering to narrower extremities. Attached to them were thick cylinders well clad in iron at the ends, and there were nailed to them timbers like beams from a large house. These timbers had the slings from the back side and from the front strong ropes, by which, pulling down and releasing the sling, they propel the stones up high with a loud noise. And on being fired they sent up many stones so that neither earth nor human constructions could bear the impacts.

The defenders also made use of stone-throwing machines, *πετραρέαι*, to fire back at the Avaro-Slav artillery (I 187.21). Sailors on the ships bringing supplies to the city were said to be experienced operators of these *petrareai*. The enemy is reported to have moved up to the walls certain engines of twisted wicker, *τινα ἐκ λυγοπλέκτων ὄργανα*, and *petrareai*.¹¹ Elsewhere the text speaks of both *helepoleis* and *petroboloi*, but the distinction between them is not clear (I 148.27, 152.10).

Byzantine authors tend to use generic terms, so that artillery and other siege equipment are referred to simply as stone-throwers, machines, engines, siege machines: *πετροβόλα*, *λιθοβόλα*, *πολιορκητικά*, *μαγγανικά*, *ὄργανα*, *μηχαναί*. As a result, it

¹⁰P. Lemerle, *Les plus anciens recueils des Miracles de Saint Démétrius et la pénétration slaves dans les Balkans I* (Paris 1979) 154; the translation is taken from S. Vryonis, "The Evolution of Slavic Society and the Slavic Invasions in Greece," *Hesperia* 50 (1981) 384. There is some dispute about the date, some scholars putting the attack ten years earlier, but that need not affect our discussion here.

¹¹I 214.23. In 713/4 *petrareai* were positioned on the towers to strengthen the defenses of Constantinople: *Theophanes Chronographia*, ed. C. de Boor (Leipzig 1883) I 384.11–12. The tenth-century treatise on withstanding a siege prescribes hurling stones at the enemy, using *petrareai*, machines, and *alakatia* (λεκατιών): *De obsidione toleranda*, ed. H. van den Berg (Leiden 1947) 56.6. *πετραρέαι* is sometimes written *τετραρέαι*. If this is not simply a scribal error, it could possibly be derived from *tetra-*, that is, a four-legged or trestle-framed trebuchet. *λυγοπλέκτων* can refer to wicker roofs for tortoises or rams, or it could also mean several wooden spars bound together to form the flexible rotating beam of a trebuchet.

cannot be proved that a stone-throwing machine always means a trebuchet. In Classical usage, *helepolis* designated a movable siege tower, the invention of which or, at least, its first recorded effective use can be dated to 307 B.C., but except for a few archaizing passages, it is never so used by later Greek authors.¹² In addition to the generic *πύργος*, the Byzantine word for such a tower was *μόςσυν*. The tenth-century *Sylloge Tacticorum* clearly states that *μόςσυν* was the term preferred by writers on tactics.¹³ The fact that Anna Komnene employs this technical term several times indicates that she was well informed on military matters.¹⁴ Still, some ancient authors, such as Josephus, defined *helepolis* as a battering ram, and it is used in that sense once by Leo the Deacon in the tenth century: "The Romans," by which he must mean the ancient Romans, "call this device a ram."¹⁵ It seems that *helepolis* was often used to designate what was regarded as the most powerful siege weapon of its time, whether a tower, a ram, or a catapult. In Byzantine usage, however, *helepolis*, as will be clear in the following pages, almost invariably means a stone-throwing trebuchet.¹⁶ In this

¹²Diod. 20.48; Plut. *Dem.* 21; see also 1 Macc. 43–44. The tenth-century writer on siegecraft twice describes a *helepolis* as a movable tower but, in both cases, he is drawing on earlier sources: D. F. Sullivan, *Siegecraft: Two Tenth-Century Instructional Manuals by "Heron of Byzantium"* (Washington 1999) 106.38, 114.5. Let me here express my thanks to Dr Sullivan for his helpful suggestions about technical terms. Procopius pictures a fighting platform on top of an elephant as a sort of live *helepolis* approaching the walls: *Goth.* 8.14.35.

¹³53.8; ed. A. Dain (Paris 1938) 102. In Classical Greek *μόςσυν* meant a wooden house, tower, or palisade.

¹⁴*Anne Comnène Alexiade*, ed. B. Leib (Paris 1937–1943), hereafter *An. Komn.* (references are to book, chapter, section, then volume, page, line): 4.1.1 (I 144.2), 4.4.5 (I 153.4, 11), 4.5.1 (I 154.11), 11.1.4 (III 9.21), 11.1.6 (III 10.13), 13.3.9 (III 98.5), 13.3.11, 12 (III 99.3, 12, 15, 30).

¹⁵Joseph. *Bf* 3.230.2, 5.279.4, 6.23.1, etc.; Leo Diac. 2.7 (p.25.13 Bonn).

¹⁶The first scholar to point this out was Paul Chevedden, "The Invention of the Counterweight Trebuchet," forthcoming in *DOP* 54, to whom I am greatly indebted for getting me started on this article and for his many criticisms and suggestions. On western terminology see his "The Artillery of

article, I simply transliterate helepolis when it occurs in the sources in order to emphasize its proper meaning; ordinarily, though, it should be translated as trebuchet. One also finds the adjective ἐλεπολικός, as well as the verb ἐλεπολέω, "to take by means of helepolis." For example, Thomas the Slav led his armies over into Thrace to take Byzantium with helepoleis, ἐλεπολεῖν τὸ Βυζάντιον.¹⁷

This use of helepolis to mean trebuchet is found as far back as Simokatta, in the seventh century; in addition to the passage cited above, he writes of a Byzantine attack on a Persian fortress situated on a height.¹⁸ Herakleios ordered the helepoleis to be placed in position and to launch missiles directly at the fortifications, as well as over them into the fortress. The Byzantines kept up the barrage night and day, changing the pulling teams at regular intervals. Later, in their turn, the Persians encircled Daras, built towers and positioned helepoleis around the city (3.11.2). On another occasion, the Avars set up helepoleis around Drizipera (6.5.4). In 715, the usurper Theodosios had a difficult time gaining access to the imperial palace, even though he had assaulted it for a long time with all sorts of helepoleis, ἐλεπόλεων εἶδεσι παντοίοις.¹⁹

King James I the Conqueror," *Iberia and the Mediterranean World of the Middle Ages: Essays in Honor of Robert I. Burns, S.J.*, ed. P. Chevedden, D. J. Kagay, P. G. Padilla (Leiden 1996) II 47–94. The *Souda* (dated to ca 1000) defines helepolis simply as a machine used in besieging cities, but elsewhere notes that a wall faced with unbaked bricks stands up better against helepoleis than does one of baked bricks and stones, which shatter and lose their mortar; the soft brick apparently absorbs the shock of the missiles: E 799, A 239 = Π 1777 (II 243, I 27, IV 149 Adler).

¹⁷*Iosephi Genesisii Regum libri quattuor* 2.2, edd. A. Lesmueller-Werner and I. Thurn (CFHB 14: Berlin/New York 1978) 24.22–23.

¹⁸Simocatta 2.18.2–6. Also an Armenian account of Herakleios' siege of Tiflis in 624, "four-wheeled balistra and divers other weapons built by Roman engineers with which they unerringly hurled enormous boulders to breach the walls": *The History of the Caucasian Albanians by Moses Dasxuranci*, transl. C. J. F. Dowsett (London 1961) 85.

¹⁹*Vita of St Germanos*, ed. L. Lamza, *Patriarch Germanos I von Konstantinopel (715–730)* (Das östliche Christentum N.F. 27 [1975]) 200–240, esp. 216.

In 821–823, the forces of the would-be emperor Thomas brought up “rams, tortoises, and some helepoleis in order to shake down the walls” of Constantinople (Theoph.Cont. 2.13). In addition to *petroboloi*, ladders, rams, tortoises, as well as fire arrows from his ships, Thomas ordered the engagement of some four-legged helepoleis, *τισι τετρασκέλεσιν ἐλεπόλεσιν* (2.14). These last were obviously large, trestle-framed, traction trebuchets, the other *petroboloi* perhaps being smaller. “Every day large bands of soldiers brought these machines forward against the walls of the city” (2.18).

In their assault on Amorion in 838, the Saracens employed “all kinds of machines and helepoleis by which a city is taken and plundered,” *μηχανημάτων καὶ ἐλεπόλεων*.²⁰ The helepoleis were moved forward and “in thirteen days the walls were cast down by the operation of the helepoleis” (12.5, 65.6–7).

Siege machines, incidentally, also figure in spiritual warfare. The helepoleis of invisible enemies pound the soul, demolish virtue, and assault the monk with bolts of improper desires.²¹ Demons fired temptations like missiles at saints such as Athanasios of Athos and Gregory of Dekapolis: *ἐλέπολιν τῶν πειρασμῶν κινήσας, τὰς τῶν ἀντιπάλων ἐλεπόλεις*.²²

Constantine Porphyrogennetos compiled an inventory of the weapons and equipment assembled for the unsuccessful invasion of Crete in 949 (*De caer.* 2.45). For attacking a fortress,

²⁰Skazaniija o 42 amorijskich mučenikach, ed. V. Vasil'evskij and P. Nikitin (St Petersburg 1905) 11.30. For an Arab account of this siege see P. Chevedden, “The Hybrid Trebuchet: The Halfway Step to the Counterweight Trebuchet,” *On the Social Origins of Medieval Institutions. Essays in Honor of Joseph O'Callaghan*, ed. D. J. Kagay and T. M. Vann (Leiden 1998) 179–222, esp. 189 [hereafter CHEVEDDEN].

²¹Eus. *HE* 10.4.57; Nilus *Mon.exerc.* 54 (PG 79.792B); Isid. *Pel. Ep.* 87 (PG 78.244A). Clearly, these authors were not thinking of trebuchets but of earlier kinds of artillery.

²²*Vitae duae antiquae sancti Athanasii Athonitae*, ed. J. Noret (Turnhout 1982) A.114.2–3 (p.54); *Ignatius Diakonus und die Vita des hl. Gregorios Dekapolites*, ed. G. Makris (Byzantinisches Archiv 17 [Stuttgart/Leipzig 1997]) 8.5.

καστρομαχία, τειχομαχία, the ships were to transport large arrow-firing *ballistae*, τοξοβαλίστραι μεγάλοι, and a number of πετραρέαι. Next in order the manifest listed λαμβδαρέαι, sometimes written as λαβδάραι; this often designates two-legged supports, *lambda*-shaped, on which a heavy spear rested with its point projecting toward the enemy.²³ But Constantine lists this among the *mangana*, siege machines, together with *petrareai* and *alakatia*. There were four *petrareai*, four *lambdareai*, and four *alakatia* and, for these twelve engines, there were twelve iron slings, in addition to various nuts and bolts. As noted above, in the *Taktika* of Constantine's father Leo, *alakatia* were clearly trebuchets. It seems likely, then, that the *petrareai*, *lambdareai*, and *alakatia* were trebuchets constructed according to three different patterns.

Constantine also recommended that the emperor take a number of books along with him on a military expedition.²⁴ Among these were manuals of strategy, mechanical treatises, including the construction of helepoleis, the fabrication of missiles, and other works helpful in waging war and conducting sieges.

To commemorate the successful invasion of Crete by Nikephoros Phokas in 961, Theodosios the Deacon composed a poem in which he depicted a very large trebuchet hurling a live jackass into the enemy city. The commander placed the animal in the sling and ordered the men to launch it, "a live jackass for the jackasses." The men stationed among the braided ropes then sent the unfortunate beast along the skyway.²⁵ Even if the flight were only one of poetic fancy, it must have been credible to contemporaries that a live ass could actually have been propelled skyward by a large trebuchet.

²³E. McGeer, "Μενούλιον-Μενυλάτοι," *Diptycha* 4 (1986) 53-58; "Tradition and Reality in the *Taktika* of Nikephoros Ouranos," *DOP* 45 (1991) 129-140, esp. 134-135; Chevedden 199-200.

²⁴*Three Treatises on Imperial Military Expeditions*, ed. J. Haldon (CFHB 28 [Vienna 1990]) C.197 (p.106).

²⁵*Theodosii diaconi de Creta capta*, ed. U. Criscuolo (Leipzig 1979) 716-721; cf. 326, 973.

The *Sylloge Tacticorum*, probably compiled about the middle of the tenth century, offers suggestions for defending against missiles hurled by stone-throwing engines and helepoleis, πετροβόλων ὀργάνων καὶ ἐλεπόλεων (53.5). The difference between the two, if indeed there is one, may be that the helepoleis were more powerful.

Later in the century another military manual recommended that an army besieging a city should pitch camp far enough away to be out of range of arrows or missiles from the stone-throwing machines. But it should not be too far from its own siege engines, πολιορκητικὰ ὄργανα; otherwise, the defenders may sally forth and chop them down and burn them.²⁶ The attacking troops should encamp close enough so that they can race out of their tents to protect their helepoleis, τοῖς ἐλεπολικοῖς ὀργάνοις (26.20 [p.316]). The manual again mentions πετροβόλοι καὶ ἕτερα ἐλεπολικά and discusses the placement of stronger helepoleis, τὰ κρείττονα τῶν ἐλεπολικῶν μηχανημάτων, and urges that there be no letup in the bombardment (27.2–9, 26.16 [pp.318, 316]).

In his history of the reigns of Nikephoros Phokas and John Tzimiskes, Leo the Deacon employs generic terms in writing about siege weapons: πετροβόλα ὄργανα, ἀφητερίους μηχανάς, ἐκηβόλα ὄργανα. But on occasion he is more specific and records the use of helepoleis to knock down walls. These were constructed in situ by carpenters brought along for this purpose, or they were transported on campaign in wagons, probably un-assembled.²⁷ He also notes that they were useless in the hands of an inexperienced crew (10.8 [p.171.17–19]).

Skylitzes also employs generic terms, such as *petrobolos*, but he does mention helepoleis, stone-throwing engines, designed to

²⁶“Campaign Organization and Tactics” 21.35–90, ed. G. T. Dennis, *Three Byzantine Military Treatises* (CFHB 25 [Washington 1985]) 306.

²⁷In situ: 1.9 (p.16.15, 21), 2.6 (p.24.13), 4.10 (p.70.8); transported: 8.4 (p.132.21), 8.5 (p.134.21), 10.8 (p.171.17).

pound fortifications, for example outside Melitene in 873, at Nicaea in 978, and against Thessaloniki in 1040.²⁸ Against Mantzikert in 1048–1049 the Turks employed various kinds of helepoleis and all sorts of other machines, ποικίλαις ἐλεπόλεσι . . . παντοίοις εἵδεσι μηχανημάτων, and one of their officers positioned the helepolis on a nearby hill from which they could shoot missiles directly into the city (p.462.53).

An Armenian account of the Seljuq siege of Mantzikert in 1054 describes a huge trebuchet, originally built for Basil II, called a *baban*, which weighed some 2,000 kilograms and had a pulling crew of 400 men and which could fire stones weighing up to 200 kilograms.²⁹ Michael Attaleiates apparently refers to the same siege, for he describes a trebuchet operated by a large number of men which fired an immense stone against which the defenders were helpless (46.8). They were saved only when a Latin grabbed a container of Greek fire, dashed out through the besiegers, and set the machine on fire. He informs us that when Romanos IV Diogenes in 1071 was preparing an assault against the same city, he had a large number of helepoleis prefabricated, ἐκ παρασκευῆς κατωργανωμένας, from huge beams of all sorts and transported by no less than a thousand wagons, obviously very large trebuchets (151.8–17). An Arab source speaks of one huge trebuchet transported in 100 carts pulled by 1,200 men, with a composite beam of eight spars and launching stone-shot of 96 kilograms.³⁰

In the *Alexiad*, her history of the reign of her father Alexios I Komnenos, Anna Komnene makes it abundantly clear that the major artillery piece of the Byzantines was the helepolis and

²⁸Ioannis Skylitzae *Synopsis historiarum*, ed. I. Thurn (CFHB 5 [Berlin/New York 1973]) pp.137.40, 323.9, 413.11.

²⁹Aristakès de Lastivert, *Récit des malheurs de la nation arménienne*, transl. M. Canard and Haig Berbérien (Bibliothèque de Byzantion 5 [Brussels 1973]) 83–85; English transl. R. Bedrosian, *Aristakes Lastivert's History* (New York 1985) 103–105. See Chevedden 187.

³⁰See Chevedden 188.

that it was a large, stone-throwing trebuchet. She generally uses the term in combination, *helepoleis* and *petrobola organa*. And she distinguishes three kinds of stone throwing machines: *helepolis*, *petrobolos*, *lithobolos*, with the first designating a larger and more powerful machine, very likely a hybrid trebuchet, *petrobolos* a more readily available machine, probably medium-sized, and *lithobolos* a smaller machine, perhaps of the pole-frame type, operated by one or just a few men. At any rate, the *lithoboloi* were small enough to fit on top of a wall or a wooden tower.³¹

Anna notes that the Normans constructed *helepoleis* to bombard Byzantine fortifications.³² Without *helepoleis*, armies would find it difficult to capture fortified places, as did the Latins and the Bulgarians.³³ Forced to retreat, the Byzantines burned their *helepoleis* so that the enemy would not be able to use them.³⁴ Alexios employed *helepoleis* to destroy the walls of Kastoria.³⁵ To drive the Arabs away from the coastline he positioned *helepoleis* on ships.³⁶ The Byzantine general Dalasenos employed *helepoleis* on ships to demolish fortifications on land.³⁷ Anna many times records the regular use of *helepoleis* in sieges.³⁸

To assist the Crusaders in besieging Nicaea in 1096, Alexios is said to have prepared all kinds of *helepoleis*, most of which, however, he had constructed in a manner different from the standard patterns (οὐ κατὰ τοὺς τῶν μηχανικῶν τρόπους) but

³¹ An.Komn. 4.1.1 (I 143.18, 144.4), 4.4.5 (I 153.5).

³² An.Komn. 3.12.2 (I 139.20), 4.1.1 (I 144.2), 4.4.4 (I 152.11), 4.5.1 (I 154.12).

³³ An.Komn. 10.9.3 (II 221.24), 14.1.6 (III 144.28).

³⁴ An.Komn. 13.5.6 (III 107.4, 8).

³⁵ An.Komn. 6.1.1 (II 41.15, 21).

³⁶ An.Komn. 6.13.1 (II 79.17).

³⁷ An.Komn. 7.8.10 (II 116.13).

³⁸ An.Komn. 7.3.2 (II 95.2), 7.8.3 (II 111.15), 9.3.3 (II 165.21), 11.1.3 (III 8.15), 11.1.6 (III 10.7), 11.11.7 (III 49.27), 13.3.11 (III 98.29), 13.5.4 (III 106.13).

according to plans which he himself had devised and which everyone marveled at.³⁹ This passage of his proud daughter, which there is no reason to dispute, is echoed by Euthymios Zigabenos in his dedication of a dictionary of heresies.⁴⁰ He praises Alexios for his sound judgment regarding military stratagems, his instructions on practical matters, and his mechanical genius which, many times, proved to be not inferior to that of Archimedes or Palamedes. Allowing for a touch of flattery, it is clear that Alexios must have had a reputation for mechanical inventiveness. Exactly what form this took is uncertain, but it is clear from the campaigns of his son and grandson that he or his engineers made significant improvements in the design and operation of the helepolis.

The reigns of John Komnenos and Manuel Komnenos (1118–1180) witnessed a dramatic increase in Byzantine reliance on siege warfare and, consequently, on the helepolis or trebuchet. The historian of their reigns, Kinnamos, however, employs only generic terms, such as *petrobolos*.⁴¹ Niketas Choniates is more precise, frequently using the exact term, helepolis. Around the same time, John Tzetzes in one of his letters complained that a demon had assaulted him with a helepolis, which he defines as “a stone-throwing engine by which cities are taken.”⁴² Byzantine emphasis in this period on siege warfare may have been due to the Komnenian strategy of possessing well-fortified cities; it may also have been due to advances in the technology of siege warfare, particularly in the design and effectiveness of the

³⁹An.Komn. 11.2.1 (III 11.2).

⁴⁰*Panoplia dogmatica*, at PG 130.20; composed at the request of the emperor: An.Komn. 15.9.1 (III 223.18–31). The few scholars who have doubted Anna's account are effectively refuted by Chevedden (*supra* n.16). On military developments during the Komnenian century (1081–1180) see J. Birkenmeier, *The Development of the Komnenian Army* (diss. Catholic University of America 1998).

⁴¹*Ioannis Cinnami Epitome*, ed. A. Meineke (Bonn 1836).

⁴²*Ioannis Tzetzae Epistolae*, ed. P. A. M. Leone (Leipzig 1972), scholion on ep. 95 (p.172.9).

helepolis, culminating in the invention of the counterweight trebuchet.

Choniates records that in 1130 or 1132 John surrounded Kastamon with helepoleis and captured it.⁴³ At Gangra in 1135 he kept up a constant barrage of missiles aimed at the houses within the city (20.31–39). Against the seemingly impregnable Anazarba the following year, the Byzantine trebuchets began pounding the city walls, but the Armenian defenders returned their fire with stones and fiery iron pellets which set the Byzantine helepoleis on fire.⁴⁴ John had new helepoleis built and constructed protective brick ramparts around them; his men then demolished the walls and forced their way into the city. In 1142 he took action against some island-dwellers in Lake Pousgouse by lashing small boats together and making a platform on which he positioned helepoleis (38.6–12).

Soon after the triumphal entry of John Komnenos into Constantinople late in 1138, after a victorious campaign in the east, Nikephoros Basilakes delivered a lengthy oration in his honor. Among other things, he recalls a number of successful sieges. One must, of course, make due allowance for rhetorical exaggeration but, at the same time, one must acknowledge that such an oration, pronounced not long after the events it commemorated and before men who had taken part in those events, is not completely devoid of historical truth. Against Tarsus an intensive bombardment with large stones, "fired as though by ten thousand hands," demolished the forward towers and the circuit wall.⁴⁵ John ordered the helepoleis to be brought forward

⁴³*Nicetae Choniatae Historia*, ed. I. A. van Dieten (CFHB 11 [Berlin 1975]) p.18.73–75, hereafter *Nik.Chon.* One cannot refrain from noting that research would be greatly facilitated if modern editions of such sources as Choniates and Skylitzes, unreasonably expensive as they are, had been furnished with complete indices. On the trebuchets of John Komnenos as recorded in Arabic sources, see Chevedden (*supra* n.16).

⁴⁴*Nik.Chon.* 26.67–82; cf. *Kinnamos* 17.16–18.2.

⁴⁵*Nicephorus Basilaca, Orationes et epistolae*, ed. A. Garzya (Leipzig 1984) p.57.

and soon stones fell from the air, with a rushing sound, upon the citadel (58.31–59.1). The orator corroborates Choniates' account of the siege of Anazarba (July 1137), at which the defenders managed to burn down the Byzantine helepoleis and shoot their operators, to which the emperor responded by building new helepoleis and protecting them and the men with brick walls (60–61).

Theodore Prodromos composed several poems commemorating the victorious campaigns of John Komnenos in the 1130s. He praises him for choosing not to endanger his troops by engaging the enemy in pitched battle in the open, but for choosing to break down the enemy's fortifications instead.⁴⁶ The emperor forced the city to surrender without shedding blood; simply setting up his powerful siege machines was enough to bring the garrison to its knees (3.78). John then surrounded Kastamon with machines hurling rocks heavy enough to break up its foundations, hurling them like hail (8.60–64). After taking that city, he deployed his stone-throwing engines like a veritable wall around Gangra (75–79, 120–124). Prodromos imagines the emperor picking up a large stone, placing it in the sling, "the destroyer of walls," and ordering the operators, "the stone shakers," to hit the target. They fired the machine which propelled the stone, making a whistling noise and crushing a house and its inhabitants (170–185).

The historian, the orator, and the poet all agree in emphasizing the terrifying effectiveness of the siege weapons employed by the armies of John Komnenos. And their respect for such awesome artillery is clearly reflected in contemporary Arab chronicles. It is obvious that these were far more powerful than the helepoleis that pounded Thessaloniki late in the sixth century and even more powerful than those used by John's father in the eleventh. While the texts at our disposal preclude

⁴⁶Theodoros Prodromos, *Historische Gedichte*, ed. W. Hörandner (Wiener byzantinische Studien 11 [Vienna 1974]) 3.68.

certitude, it is difficult not to recognize in these machines the fully developed counterweight trebuchet.

In 1165 four large Byzantine trebuchets launched huge stones against the Hungarian city of Zevgminon.⁴⁷ Andronikos Komnenos, after personally adjusting the sling, the winch, and the beam, σφενδόνην, στρόφαλον, λύγον, fired stones which hit with such violence that they brought down a section of the wall between two towers. The last word, λύγος, can mean a withe, willow branch, a tough, flexible branch, or several branches bound together and thus can designate the rotating beam of the trebuchet which was made of one shaft of wood or of several tied together for greater flexibility. The mention of a winch, not needed in a traction trebuchet, indicates that this was a counterweight one, the first clear reference to such. This is confirmed by the statement that by adjusting the three components, Andronikos was able to aim the device with great precision.

At the siege of Nicaea in 1184 the trebuchets employed by Andronikos were put out of commission by stones hurled by the defenders (Nik.Chon. 282.73–76). Boasting of his skill in taking cities, he again set up his helepoleis and carefully adjusted the sling, the beam, and the winch, but his efforts were wasted as the defenders sallied forth from postern gates and set the machines on fire. Not long afterward, however, his boasting was justified at Prusa, where his helepoleis repeatedly struck one section of the wall until it crumbled (287.35–39). In 1197 a master gunner is said to have inflicted heavy casualties on the Byzantine troops assaulting the Vlach-held fortress of Prosakos after he rotated the beam (λύγος) and adjusted the sling (σφενδόνη) of the trebuchet (506.29–33). In 1169 helepoleis were employed by a Byzantine contingent which had joined the Latins in an unsuccessful attack on Damietta in Egypt (163.12–16).

In his account of the Norman assault on Thessaloniki in 1185, the archbishop of the city Eustathios wrote that the

⁴⁷Nik.Chon. 134.79–82; see Chevedden (*supra* n.16).

attackers on the western side brought up new kinds of helepoleis which were difficult to handle because of their large size, and so proved ineffective. Perhaps these were counter-weight trebuchets either poorly constructed or operated by inexperienced men. To the east, though, the Normans, mostly from the fleet, employed more conventional methods, such as mining operations and firing small, antipersonnel stone-throwers, although they did have two larger ones, one of which was called "the daughter of the earthquake."⁴⁸ Because they could be accurately aimed, the small stone-throwers caused a good deal of damage. But, Eustathios adds, these were like rocks thrown by children compared to the stones, as large as a man could lift, hurled by "their mother," the huge trebuchet. As the stones whizzed through the air and crashed against the walls, the commander in the city was heard to remark: "Listen to the old lady" (98–99).

About 1198 the obnoxious careerist Mesopotamites fell out of favor and was "expelled from the palace like a well-rounded missile propelled by a powerful helepolis" (Nik.Chon. 491.17–19).

In 1204 Leon Sgouros, instead of facing up to the Latin invaders, turned against his fellow Greeks and planned to take the acropolis at Athens by setting up helepoleis to terrify the defenders into surrender (605.74). In an effort to dissuade him, Michael Choniates, metropolitan of Athens and brother of the historian, "with his pastoral sling hurled missiles of divinely inspired words ... as though from a helepolis" (606.85). In 1205 the Bulgarians besieged the Latins who had taken refuge in the citadel of Serres and on a hill opposite it constructed a huge helepolis which pounded the walls (619.22–34). Two years later they bombarded Adrianople with helepoleis, which brought the

⁴⁸Eustazio di Tessalonica, *La espugnazione di Tessalonica*, ed. S. Kyriakidis, transl. V. Rotolo (Palermo 1961); this Greek edition is reprinted with English transl. by J. Melville-Jones, *Eustathios of Thessaloniki. The Capture of Thessaloniki* (Byzantina Australiensia 8 [Canberra 1988]) 72–75.

walls crashing to earth (636.25–27). When in 1205 the Vlach and Cuman allies of the defenders of Adrianople set his helepoleis on fire, the Latin emperor Henry cut down the masts of ships along the coast and built new ones, sheathing them in iron to protect them from being burned (623–624).

Early in the fourteenth century, the Greek version of the *Chronicle of Morea* called this weapon by its French name: trebuchet, τριμπουτσέτο.⁴⁹ Around the end of that century one again finds helepolis used for trebuchet in an account of sultan Bayezid's siege of Constantinople in 1396–1397.⁵⁰ And in 1422 Murad had trebuchets, this time called ἐλεπάλλξεις (battlement-taker), prepared to bombard the city with large stones.⁵¹ Thirty-one years later, however, the walls were pummeled by huge stones propelled by gun powder from cannons, and the helepolis or trebuchet was sent off to the dustbins of history.

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⁴⁹Tò Χρονικὸν τοῦ Μορέως, ed. P. M. Kalonaros (Athens 1940) 852, 1412, 1700, 8430, 9155.

⁵⁰P. Gautier, "Un récit inédit du siège de Constantinople par les Turcs (1394–1402)," *REB* 23 (1965) 100–117, at 106.36.

⁵¹Ducas, *Istoria Turco-Bizantina* (1341–1462), ed. V. Grecu (Bucharest 1958) 28.6 (p.235.29).