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## Auxiliary Artillery Revisited

As regards the equipping of the Roman armed forces with artillery, the position of the *auxilia* has never been clear. Although ordnance is amply attested in the hands of the legions and, to a lesser extent, the Praetorians, *vigiles* and naval units, there is neither literary record nor sculptural representation to suggest its use by auxiliaries<sup>1</sup>. Indeed, Tacitus states explicitly that Civilis' Batavian troops at the siege of Vetera in AD 69 were unfamiliar with the use of *machinae*, and crews of auxiliaries are never shown operating the *ballistae* on Trajan's Column<sup>2</sup>.

In the documentary sources, artillery is clearly associated with legionary troops. Vegetius' description of the *carroballista* and the *onager* falls within his discussion of the *antiqua legio*, and it can be seen from the orders of march recorded by Arrian and Josephus that the artillery of an army on campaign belonged to the legions<sup>3</sup>. Furthermore, it has been demonstrated that the catapults used by Vespasian's army before Jotapata in AD 67 were provided by his three legions<sup>4</sup>, while the legionaries engaged in bridge-building on the Euphrates under the command of Avidius Cassius in AD 165 were able to provide supporting artillery-fire, apparently a common feature of bridging operations<sup>5</sup>.

Similarly, *ballistarii* are normally associated with the legions: the lawyer and military

<sup>1</sup> This point was made in the pages of this journal twenty years ago by D. BAATZ (Bonner Jahrb. 166, 1966, 194–207). The evidence of alleged artillery ammunition, omitted from the present discussion because of its ambiguous nature, was dealt with by BAATZ, whose comment, 'es ist sehr schwierig, unter den Waffenfunden (i. e. boulders and iron bolt-heads) diejenigen herauszufinden, welche mit Sicherheit zur Geschützbewaffnung gehörten' (p. 207), still holds good. – My thanks are due to D. BAATZ, D. J. BREEZE, and M. W. C. HASSALL for their helpful criticism of this paper in a previous draft. Of course, full responsibility for the conclusions drawn here rests with the author alone.

<sup>2</sup> TAC. hist. 4,23. – C. CICHORIUS, Die Reliefs der Traianssäule (1896–1900) pl. xxxi; xlvi–xlvii.

<sup>3</sup> VEG. mil. 2,25. – ARR. Alan. 5. – IOS. bell. Iud. 3,121; 5,48.

<sup>4</sup> D. BAATZ, Zur Geschützbewaffnung röm. Auxiliärtruppen in der frühen und mittleren Kaiserzeit. Bonner Jahrb. 166, 1966, 195, citing IOS. bell. Iud. 3,166; cf. E. W. MARSDEN, Greek and Roman Artillery. Historical Development (1969) 180.

<sup>5</sup> SUID. s. v. ζευγµα. – CASS. DIO 71,3; cf. TAC. ann. 15,9; hist. 2,34 for artillery-support in bridge-building operations.

writer, Taruttienus Paternus, who flourished during the principate of Marcus Aurelius, lists *ballistrarii* (*sic*) among his legionary *immunes*, and βαλλιστάριοι (with the explanation, καταπελιισταί) are included in the establishment of the imperial legion as described by the sixth-century antiquary, Ioannes Lydus<sup>6</sup>. Indeed, one of the distinctions which Vegetius draws between the *auxilia* and the legions is the presence of *ballistrarii* in the latter. It is clear that these were responsible for the operation not the construction of the artillery, since Vegetius lists them alongside other missile troops such as the *sagittarii*<sup>7</sup>. In any case, he later states that the artisans under the direction of the *praefectus fabrum* were responsible for the construction and repair of artillery (amongst other things), work which presumably fell within the sphere of Taruttienus Paternus' *architectus*<sup>8</sup>. It is equally clear from the work of Vitruvius that the building of ordnance was the preserve of the *architectus* rather than the *ballistarius*; indeed, the *architectus armamentarii*, C. Vedennius Moderatus, must have been particularly involved with artillery for a representation of a *catapulta* to appear on his tombstone<sup>9</sup>. An inscription from Cisalpine Gaul, now lost, refers to one Aelius Optatus serving as *magister ballistari(orum)* in *legio XX*<sup>10</sup>, and a duty roster of *legio III Cyrenaica* dated to AD 90–96 probably indicates that legionaries were training with artillery. The papyrus records only ten days' fatigues for thirty-six soldiers and includes the entries *ballio* and *phal*; the former is generally explained as 'baths duty' although the expansion *ballistario* has been suggested, but the latter was probably an abbreviation of *phalaricis*, thus implying some connection with artillery<sup>11</sup>.

There is no corresponding evidence for *ballistrarii* in the *auxilia*, but the arming of such units with artillery would have been contrary to their tactical role during the first and second centuries AD. In addition, only a unit as large as a legion would have been able to support sundry sub-groups such as an artillery-corps which, as we have seen, required not only trained soldiers to operate the catapults, but workshops and specialist artificers to build and maintain them; the small auxiliary units surely could not accommodate such a degree of specialisation<sup>12</sup>. Thus, even with the change in the

<sup>6</sup> Dig. 50,6,7. – LYD. mag. 1,46.

<sup>7</sup> VEG. mil. 2,2.

<sup>8</sup> VEG. mil. 2,11. Even though Vegetius may be wrong to link the legionary *fabri* with the *praefectus fabrum* (cf. B. DOBSON, The Praefectus Fabrum in the Early Principate, in: M. G. JARRETT and B. DOBSON [edd.], Britain and Rome [1966] 62), the passage is important in listing the duties of the *fabri*, cf. LIV. 1,43,3. For the *architectus* see Dig. 50,6,7.

<sup>9</sup> VITR. 1 praef. 2; 1,8; 10,10–12. – For a photograph of the *catapulta* depicted on Vedennius' tombstone (CIL VI 2725 = ILS 2034), see MARSDEN *op. cit.* (note 4) pl. 1.

<sup>10</sup> CIL V 6632. – The supposed *ballistarius legionis I Italicae* cited by MARSDEN *op. cit.* (note 4) 192 note 2, must be dismissed following the reinterpretation of the inscription, Jahresh. Österr. Arch. Inst. 30, 1936, 122 = AE 1937, 102. The word βαλλιστες cannot be cognate with *ballistarius*, the Greek form of which is βαλλιστάριος, cf. AE 1933, 217; the inscription more probably refers to βάλης τεσ(σεράριος) (i. e. *Valens tesserarius*). The epigraphically attested *scorpionarius* reported by H. U. NÜBER, Die röm. Kastelle bei Hofheim am Taunus (1983) 11, has not yet been fully published, and its significance cannot be commented upon in any detail here.

<sup>11</sup> Pap. Gen. Lat. 1,5. – A. BRUCKNER and R. MARICHAL (edd.), Chartae Latinae Antiquiores 1 (1954) 17–18. Pap. Dur. 106 of AD 235–240 shows that an unspecified number of soldiers were assigned *ad ballistas*, and these could well have been legionaries given the mixed garrison of Dura Europos in the third century.

<sup>12</sup> There are over 100 different specialist posts known, the holders of which were granted exemption from fatigues. However, the auxiliary *fabricae* were probably manned only by the general craftsmen required

duties of the *auxilia* to the mainly policing activities of frontier control, artillery does not become by any means widespread<sup>13</sup>. In fact, in only four instances can such arming of auxiliaries be inferred with any degree of certainty, namely at Hatra, High Rochester, Jerusalem and Phasis, and none of these is beyond doubt, as will be seen.

### 1 Hatra (Iraq)

The caravan city of Hatra, which flourished during the first two centuries AD, is situated west of the Tigris beside the Wadi Tharthar<sup>14</sup>. The large central temple complex and rich assemblage of sculptures and inscriptions are evidence of the prosperity enjoyed by the Hatreni, perhaps derived from control of the trade route to Northern Syria from the Persian Gulf, on analogy with Palmyra<sup>15</sup>. The almost circular towered wall encloses some 320 ha (800 acres), hardly the 'neither large nor prosperous city' which Cassius Dio describes, although his remarks on the water situation are accurate<sup>16</sup>.

Nominally under Parthian control, Hatra was besieged by the emperor Trajan some time between his capture of Ctesiphon in spring AD 116 and his death in summer AD 117, but the hardships suffered by his troops in this barren land forced him to withdraw<sup>17</sup>. Similarly, when Septimius Severus twice came to attack the city in AD 198, the stout defence of the besieged coupled with the dreadful climate foiled his plans<sup>18</sup>. The city presumably changed allegiance on the collapse of the Arsacid dynasty in Parthia, since the first of the Sasanid Persians, Ardashir I, attempted to capture her, albeit unsuccessfully, some time between AD 227 and 230<sup>19</sup>. The first indicator of her new philo-Roman stance is an inscription recording the consular date for AD 235, and two other inscriptions record the presence of *cohors IX Maurorum*

for the maintenance of the fort rather than specialists like engineers. It is perhaps significant that, although *architectus* are attested in Praetorian, legionary and naval units (e. g. CIL VIII 2850; X 5371; XI 20), no auxiliary examples are known. Thus, if artillery was ever operated by auxiliaries, it seems likely that it would have been constructed and serviced in a legionary workshop.

<sup>13</sup> Even in the late empire, by which time the legions had lost their organic complement of artillery, the special units of *ballistarii* appear to be composed of legionary troops: e. g. Not. dign. or. 7,43; 8,46–47 for *legiones comitatenses*; Not. dign. or. 7,57; 9,47; Not. dign. occ. 7,97 for *legiones pseudocomitatenses*. See D. HOFFMANN, *Das spätröm. Bewegungsheer und die Notitia Dignitatum*. Epigr. Stud. 7,1 (1969) 181 f.

<sup>14</sup> W. ANDRAE, *Hatra II. Einzelbeschreibung der Ruinen*. Wiss. Veröffentl. Dt. Orientges. 21 (1912). – See also, most recently, H. J. W. DRIJVERS, *Hatra, Palmyra und Edessa. Die Städte der syrisch-mesopotamischen Wüste in politischer, kulturgeschichtlicher und religionsgeschichtlicher Beleuchtung*, in: ANRW II 8 (1977) 803–837, with full bibliography at 897–899.

<sup>15</sup> M. G. RASCHKE, *New Studies in Roman Commerce with the East*, in: ANRW II 9,2 (1978) 643 and note 792; cf. M. ROSTOVZEF, *The Social and Economic History of the Roman Empire*<sup>2</sup> (1957) 604 note 19.

<sup>16</sup> CASS. DIO 68,31,1.

<sup>17</sup> CASS. DIO 68,31–32,1. – For the chronology, see F. A. LEPPER, *Trajan's Parthian War* (1948) 95 f.

<sup>18</sup> CASS. DIO 75,10,1; 75,11–12,5. – HEROD. 3,9,3–7. – Both campaigns must have occurred in AD 198, thus F. MILLAR, *A Study of Cassius Dio* (1964) 143; cf. A. R. BIRLEY, *Septimius Severus, the African Emperor* (1971) 203 f., and 345 *s. v.* *Iulius Laetus* (5). The dating of AD 200–201 suggested by W. ANDRAE *op. cit.* (note 14) 1, is much too late; Severus was in Egypt in AD 199 (CIL III 6581 = ILS 2543).

<sup>19</sup> CASS. DIO 80,3,2.

during the reign of Gordian III (AD 238–244)<sup>20</sup>; the city seems to have been incorporated into the Roman frontier system, according to the Tabula Peutingeriana, perhaps under Severus Alexander<sup>21</sup>. Ardashir launched a second offensive against the eastern Roman provinces towards the end of his reign, capturing Carrhae and Nisibis probably in AD 238. It is generally accepted, on the authority of a Greek papyrus, that Hatra fell to the Persians in AD 240/1, at which time Shapur was crowned, although the papyrus suggests that Ardashir captured the city while popular legend credits Shapur with the deed<sup>22</sup>. Certainly, the city was thoroughly sacked, and in AD 363, when Jovian's army passed by in their retreat from Ctesiphon, Hatra was nothing more than 'an ancient town in the middle of the desert, long ago abandoned'<sup>23</sup>.

The remains of a *ballista* were discovered here in 1972 comprising the bronze frame and three of the four washers which originally held the torsion skeins; a number of smaller associated finds probably originated from the same weapon, and some previously discovered bronze fittings are almost certain to have derived from a second catapult<sup>24</sup>. Since the remains were buried in the mid-third century destruction layer, they ought to date from Hatra's philo-Roman phase, when the auxiliary cohort was billeted within her walls. However, the artillery thus represented need not have belonged to this cohort since the Hatreni themselves were perfectly capable of operating it. Indeed, the catapults with which they defended their city against Severus were of some sophistication, firing naphtha and, in some cases, two missiles at once<sup>25</sup>. Less probable is the suggestion that the artillery-crew was provided by an unattested legionary vexillation, although examples of troops detached from their parent legion for special duties are known<sup>26</sup>.

<sup>20</sup> AE 1958, 238–240. – cf. D. OATES, A Note on Three Latin Inscriptions from Hatra. *Sumer* 11, 1955, 39–43. – A. MARICQ, Les dernières années de Hatra: l'alliance romaine. *Syria* 34, 1957, 288–296. This is one of the few instances of a regular *cohors Maurorum* in the Roman army: a *cohors II Maurorum* is recorded early in the third century (CIL VIII 4323), and at least two *cohortes Maurorum* are attested in Pannonia later in the same century (CIL III 3324; 3668; 3675, for a quingenary cohort; CIL III 3444, 3542, 3545, 10673a–e, ILS 2552, for a milliary cohort). G. ALFÖLDY, *Noricum* (1974) 259, has suggested that the *ad Mauros* (Eferding) of Not. dign. occ. 34,31 perhaps housed a Moorish regiment, and a similar explanation is possible for the *castra Maurorum* mentioned by AMMIANUS MARCELLINUS (18,6,9 and 25,7,9) although J. C. ROLFE, *Ammianus Marcellinus*. Loeb Class. Library (1935) I 438 note 3, prefers to see *Maurorum* in this context as a corruption of *Mororum*, 'place of the mulberries'. The high numeral of the Hatra cohort has been discussed recently by D. L. KENNEDY, *Cohors XX Palmyrenorum* – an Alternative Explanation of the Numeral. *Zeitschr. Papyrol. u. Epigr.* 53, 1983, 214–216. I am grateful to Dr. MARGARET ROXAN for helpful discussion on the subject of the Mauri.

<sup>21</sup> D. OATES, *Studies in the Ancient History of Northern Iraq* (1968) 78.

<sup>22</sup> The most recent treatment of these events is R. N. FRYE, *The Political History of Iran under the Sasanians*, in: E. YARSHATER (ed.), *The Cambridge History of Iran III 1* (1983) 124 f. See also X. LORIOU, *Les premières années de la grande crise du IIIe siècle: de l'avènement de Maximin le Thrace (235) à la mort de Gordien III (244)*, in: ANRW II 2 (1975) 761 f., citing E. HENRICHs and L. KOENEN, *Ein griechischer Mani-Codex*. *Zeitschr. Papyrol. u. Epigr.* 5, 1970, 125–132. On the legend, see E. YARSHATER, *Iranian National History*, in: YARSHATER *op. cit.* 380.

<sup>23</sup> AMM. 25,8,5.

<sup>24</sup> The ballista fittings are fully discussed by D. BAATZ, *The Hatra Ballista*. *Sumer* 33, 1977, 141–151. – IDEM, *Recent Finds of Ancient Artillery*. *Britannia* 9, 1978, 3–9.

<sup>25</sup> CASS. DIO 75,11,2–4.

<sup>26</sup> A legionary vexillation is suggested by D. BAATZ, *Sumer* 33, 1977, 144; *Britannia* 9, 1978, 9. Vexillations were normally drawn off for transfer to war-zones either to supplement the fighting force or to replace casualties. Detachments are also frequently found engaged on building projects and acting as garrison

## 2 High Rochester (England)

Sited west of Dere Street on the edge of a ridge overlooking the Rede valley, this fort was probably founded in the 70s by Cn. Iulius Agricola, and continued in occupation with only short breaks until the fourth century; by then, it formed the northernmost outpost of the empire, which was to prove a dubious distinction with the increasingly frequent hostilities in the area<sup>27</sup>.

The fort displays five phases, the earliest two being of turf-and-timber, followed by a Hadrianic interlude in which there seems to have been no occupation. The first of the three stone phases belongs to the Antonine period; the 2 ha (5 acres) fort was probably built c. AD 142 by Q. Lollius Urbicus as part of the programme of reoccupation in lowland Scotland<sup>28</sup>. It was perhaps evacuated for a short time in the 190s to provide extra manpower for D. Clodius Albinus in his bid for the purple (although one should not discount the possibility that a caretaker garrison was left in the fort), and the second phase, with its internal alterations, would then indicate the arrival of its third century garrison, *cohors I fida Vardullorum equitata milliaria*<sup>29</sup>. During the reign of Gordian III, the fort also housed a *numerus exploratorum*, but it is generally believed that part of the garrison was permanently outposted to patrol the area to the north<sup>30</sup>. Certainly, High Rochester would have been uncomfortably cramped, accommodating a unit of scouts as well as a milliary part-mounted cohort within its ramparts, but the excavated plan does reveal an extraordinary degree of congestion<sup>31</sup>. The third stone phase followed quickly upon the destruction of the second but whether this was occasioned by enemy action or Roman replanning cannot yet be proven; on present evidence, it is more likely that, on his visit in AD 296, Constantius Chlorus initiated a complete overhaul of the northern forts, which had become dilapidated from years of neglect<sup>32</sup>. The final abandonment of High Rochester was long thought to have been as a result either of the supposed Pictish war of AD 342/3, which had occasioned the mid-winter expedition of the emperor Constans, or of the more securely attested unrest of AD 360, which had demanded the presence of

troops. In general, see R. SAXER, *Untersuchungen zu den Vexillationen des röm. Kaiserheeres von Augustus bis Diokletian*. Epigr. Stud. 1 (1967).

<sup>27</sup> I. A. RICHMOND, *Excavations at High Rochester and Risingham, 1935*. Arch. Ael. 413, 1936, 171–184. – E. BIRLEY, *Research on Hadrian's Wall* (1961) 242–244 for full bibliography. – A. R. BIRLEY, *An Altar from Bremenium*. Zeitschr. Papyrol. u. Epigr. 43, 1981, 16, has drawn attention to the fort's large granary capacity, underground water-supply and stout defences as evidence that it was built to withstand siege.

<sup>28</sup> RIB 1276. The invasion of Scotland is dated to AD 139–140 by the preliminary rebuilding at Corbridge (RIB 1147–8) and the campaigning was over by AD 142, in which year Antoninus Pius took his second and final imperial acclamation (CIL X 515 = ILS 340). Fort construction was probably initiated immediately after, rather than during the conquest.

<sup>29</sup> RIB 1277 perhaps dates from this period on analogy with RIB 1234 from neighbouring Risingham. The Vardulli are first attested here in AD 213 (RIB 1272, cf. 1265). On the third century fort in general, see I. A. RICHMOND, *The Romans in Redesdale*, in: M. H. DODDS (ed.), *A History of Northumberland* 15 (1940) 88–94.

<sup>30</sup> RIB 1262, 1270. See H. O. FIEBIGER, *RE VI 2* (1909) s. v. *exploratores*.

<sup>31</sup> RICHMOND *op. cit.* (note 29) 108 and fig. 17.

<sup>32</sup> RICHMOND *op. cit.* (note 27) 180 f.

Julian's *magister militum*<sup>33</sup>. However, a recent reappraisal of the coin evidence suggests that the fort was not occupied beyond the reign of Constantine and it seems most likely that its garrison was amongst the troops which he removed to the continent in AD 312 for his field-army<sup>34</sup>.

The presence of artillery here is based upon two inscriptions which, when expanded, mention *ballistaria*: the first of these records the construction from ground level of a *ballistarium* during the reign of Elagabalus and is precisely dated to AD 220; the other records the complete rebuilding of a *ballistarium*, perhaps the same one, under Severus Alexander (AD 222–235)<sup>35</sup>. Although these are usually linked with the supposed *onager*-platform identified in the excavations of 1935, it is likely that the *ballistaria* in question were nothing more than artillery-emplacements for arrow-shooting catapults; the *onager* would have been tactically redundant here and the stones which have been seen as ammunition for this weapon need not even be Roman and should be treated with caution<sup>36</sup>. Yet the presence of artillery of some description, whether *ballistae* or *onagri*, is clear. It is most likely that it was operated by the auxiliaries who set up the two inscriptions, but even here a specialist crew seconded from one of the legions has been postulated<sup>37</sup>.

### 3 Jerusalem (Israel)

The weakest point in Jerusalem's defences lay to the north where the Bethesda Hill sloped down to the city walls, and it was here that the virtually impregnable Antonia fortress was situated. Originally known as Baris, it was renamed in honour of Mark Antony c. 20 BC by Herod when he refurbished it and incorporated it in the north-west corner of the enlarged temple precinct<sup>38</sup>. Unfortunately, no substantial vestiges have survived and previous reconstructions based upon the meagre archaeological evidence have recently been called into doubt<sup>39</sup>. However, we have the description of the

<sup>33</sup> RICHMOND *op. cit.* (note 29) 114. – J. C. MANN, The Northern Frontier after AD 369. *Glasgow Arch. Journal* 3, 1974, 41 and note 62.

<sup>34</sup> P. J. CASEY and M. SAVAGE, The Coins from the Excavations at High Rochester in 1852 and 1855. *Arch. Ael.* 58, 1980, 79.

<sup>35</sup> RIB 1280: *Imp(eratori) Caes(ari) M(arco) Au[r]elio | Antonino Pio Fel(ici) Aug(usto) | trib(unicia) pot(estate) III co(n)s(uli) III p(roco(n)s(uli)) | p(atr) p(atr) ballist(arium) a sol[o] cob(ors) I F(ida) | Vardul(lorum) A[nt(onia) s]ub cura | Tib(eri) Cl(audi) Paul[ini] le]g(ati) Aug(usti) | p(ro) p(raetore) fe[cit] insta[n]te | P(ublio) Ael[io] Erasino trib(umo)]*

RIB 1281: *Imp(eratori) Caes(ari) M(arco) Aur(elio) Seve[ro] | ro Alex[andr]o P(ri)mo F(elici) [Aug(usto) . . . | . . . matr(i)] i[m]p(eratoris) Caes(aris) et ca[es]s(atorum) cob(ors) I F(ida) Vard(ullorum) | m(illiar) S(everiana) A(lexandriana) ballis(tarium) a solo re[st]it(uit) | sub c(ura) Cl(audi) Apellini le]g(ati) Aug(ustorum) | insta[n]te Aur(elio) Quinto tr(ibun)to.*

<sup>36</sup> D. B. CAMPBELL, Ballistaria in first to mid-third century Britain: a reappraisal. *Britannia* 15, 1984, 83 f., contra RICHMOND *op. cit.* (note 27) 180 f.

<sup>37</sup> E. W. MARSDEN, Greek and Roman Artillery. *Historical Development* (1969) 191; cf. note 26, above.

<sup>38</sup> *IOS. bell. Iud.* 1,401 (cf. 118); *ant. Iud.* 15,409; 18,91 f.

<sup>39</sup> P. BENOIT, L'Antonia d'Hérode le Grand et le forum oriental d'Aelia Capitolina. *Harvard Theol. Review* 64, 1971, 135–167, especially 158–161. – IDEM, The Archaeological Reconstruction of the Antonia Fortress, in: Y. YADIN (ed.), *Jerusalem Revealed. Archaeology in the Holy City, 1968–1974* (1975) 87–89.

fortress given by Josephus, according to whom it sat atop a sheer-faced rock fifty cubits (25 m) high, faced with smooth flag-stones, and was separated from Bethesda by a deep ditch and a low wall. The Antonia itself was a four-towered edifice rising forty cubits (20 m) above the rock; at seventy cubits (35 m), the south-east tower was fully ten metres higher than the others in order to command a view over the entire temple enclosure<sup>40</sup>.

When Judaea was annexed as a Roman province in AD 6, the bulk of its garrison was based at Caesarea, although detachments are later found at various key points throughout the land, including Jerusalem, where a whole cohort was generally maintained<sup>41</sup>. The total strength of the garrison was at least six auxiliary units – during the principate of Augustus, Herod's 3000 Sebastene troops were almost certainly reorganised as *auxilia* and would have provided six quingenary units. Indeed, in AD 44, by which time local recruits would have replaced the discharged veterans, we hear of τὴν ἕλλην τῶν Καισαρέων καὶ τῶν Σεβαστηνῶν καὶ τὰς πέντε σπείρας (i. e. an *ala* and five *cohortes*)<sup>42</sup>, and early in AD 67, Vespasian found five cohorts and one *ala* in the province, although a unit had been massacred in Jerusalem in the previous year<sup>43</sup>. Two further cohorts are mentioned in Judaea – a σπεῖρη Ἰταλική, which has been identified as *cohort* II *Italica c. R.*, and a σπεῖρη Σεβαστή, the Greek equivalent of the Latin *cohort Augusta* and therefore not necessarily one of the above *cohortes Sebastenorum*<sup>44</sup>. The troops assigned to Jerusalem were billeted in the Antonia fortress with a detachment detailed to guard Herod's palace, the seat of the governor when he visited the city<sup>45</sup>; they were changed from time to time, as is clear from the episode of the standards during Pontius Pilate's term of office (AD 26–36/7), when the *signa* of the incoming cohort offended the Jews<sup>46</sup>. During the procuratorship of Ventidius Cumanus (AD 48–52), the garrison is referred to as ἡ Ῥωμαϊκὴ σπεῖρα, but it is not clear whether this indicates that the unit was a *cohort civium Romanorum* (like the *cohort Italica*, above) or simply Roman in the broadest sense<sup>47</sup>. Later, under Antonius Felix (AD 52–58/9), the garrison was a *cohort equitata milliaria*, if the evidence of the Acts of the Apostles can be pressed. Its commander, one Claudius Lysias, is described as ὁ χιλιάρχος τῆς σπείρης, the rank normally equated with the Latin *tribunus militum*, and the guard which he provided to escort Paul to Caesarea consisted of four

<sup>40</sup> Ios. bell. Iud. 5,149; 5,238–242.

<sup>41</sup> On Caesarea, see note 43, below; on Jerusalem, note 45. In AD 66, if not before, Roman troops were also stationed at Ascalon, Jericho, Machaerus, Masada, and throughout Samaria; Ios. bell. Iud. 2,408. 484–486; 3,12. 309.

<sup>42</sup> Ios. ant. Iud. 19,364–365 (cf. 356–358); bell. Iud. 2,52.

<sup>43</sup> Ios. bell. Iud. 2,430. 452–454 (on the massacre of the Jerusalem troops); 3,66 (on the Caesarea troops). It is improbable that the cohort was reconstituted in the intervening months between the uprising and Vespasian's arrival since, according to Iosephus, only one man survived.

<sup>44</sup> Acta 10,1; 27,2; much the same conclusions are reached by M. P. SPEIDEL, *The Roman Army in Judaea under the Procurators: the Italian and Augustan Cohort in the Acts of the Apostles*. *Ancient Soc.* 13–14, 1982–1983, 233–240, an article which came to my notice too late for use in the above text; for further discussion see E. SCHÜRER, *The History of the Jewish People in the Age of Jesus Christ* 1<sup>2</sup> (1973) 364 f.

<sup>45</sup> Ios. ant. Iud. 15,408; 20,106–107; bell. Iud. 2,224; 5,244. For the troops in Herod's palace, ant. Iud. 20,110; bell. Iud. 2,328–329.

<sup>46</sup> Ios. ant. Iud. 18,55–59; bell. Iud. 2,169–174.

<sup>47</sup> Ios. bell. Iud. 2,224 (cf. 262).

hundred infantry (half of whom were δεξιολάβοι, whatever that indicates) and seventy cavalry<sup>48</sup>. The three cohorts present in Jerusalem during the governorship of Gessius Florus (AD 64–66) were all apparently equitate: he arrived in the city μετὰ στρατιάς ἰπικῆς τε καὶ πεζικῆς, and later sent for δύο σπείραι, which consisted of στρατιῶται and ἰππεῖς<sup>49</sup>. So much for the provincial garrison.

In AD 70, when Titus began the siege of Jerusalem, the Jews retaliated with 'the artillery . . . which they had earlier taken from Cestius, and which they had captured when they overpowered the Antonia garrison', in all 340 pieces<sup>50</sup>. The magnitude of this figure presents a problem which cannot be satisfactorily solved unless we assume that Josephus has wildly exaggerated the numbers either deliberately or by accident<sup>51</sup>. Obviously, the engines which Cestius Gallus had been forced to abandon to the Jews during his withdrawal from Jerusalem in autumn AD 66 must have formed the bulk of this artillery<sup>52</sup>; his army included *legio XII Fulminata* and vexillations of two thousand men from each of the remaining Syrian legions, which probably numbered six in the aftermath of Corbulo's campaigning<sup>53</sup>. It is unlikely that each legion would have provided its entire artillery-corps and thus stripped itself of this important supporting arm; in any case, the resulting total number of catapults would far exceed Josephus' figures. Assuming that Gallus' army comprised thirty-four legionary cohorts, he could have had at his disposal thirty-four *ballistae* and around two hundred *catapultae* (i. e. one *ballista* per cohort and one *catapulta* per century), in which case the remaining 106 artillery-pieces must have come from the Antonia fortress<sup>54</sup>!

However many artillery-pieces the Jews found in the Antonia, the implications for the arming of the *auxilia* are clear. It is unlikely that a legionary detachment was permanently assigned to the Antonia since legionaries are rarely attested in Judaea before AD 66, so the artillery-crew was probably composed of auxiliaries<sup>55</sup>. However, the

<sup>48</sup> Acta 23,23. For χιλιάρχος = *tribunus militum*, see A. V. DOMASZEWSKI, Die Rangordnung des röm. Heeres. Bonner Jahrb. Beih. 14 <sup>2</sup>(1967) 40. A *cohortis quingenaria civium Romanorum* would also have been commanded by a tribune. The δεξιολάβοι were perhaps light-armed troops or archers, but the precise meaning of this rare word is unknown.

<sup>49</sup> Ios. bell. Iud. 2,296.318.326.

<sup>50</sup> Ios. bell. Iud. 5,267: τὰ δ'ἀφετήρια . . . ὅσα Κέσιτιόν τε ἀφήρηντο πρότερον καὶ τὴν ἐπὶ τῆς Ἀντωνίας φρουρὰν ἔλοντες ἔλαβον; 5,359: εἶχον δ'ὄξυβελεῖς μὲν τριακοσίους, τεσσαράκοντα δὲ τῶν λιθοβόλων . . .

<sup>51</sup> Josephus appears to have been prone to deliberate exaggeration: see SCHÜRER *op. cit.* (note 44) 57 f. – G. A. WILLIAMSON, Josephus: The Jewish War (1970) 14.

<sup>52</sup> Ios. bell. Iud. 2,553–554.

<sup>53</sup> Ios. bell. Iud. 2,500, for the composition of the army. The *exercitus Syriae* at this time seems to have comprised *legiones III Gallica, IV Scythica, V Macedonica, VI Ferrata, X Fretensis, XII Fulminata* and *XV Apollinaria*; see E. RITTERLING, RE XII 1 (1924) 1257 f. s. v. *legio*. Apart from *XII Fulminata*, only *VI Ferrata* is directly attested in Gallus' army: bell. Iud. 2,544.

<sup>54</sup> According to VEG. mil. 2,25, the *antiqua legio* had ten stonethrowing engines, one per cohort, and fifty-five arrow-firing engines, one per *centuria*. Both E. W. MARSDEN, Greek and Roman artillery. Historical Development (1969) 180 and D. BAATZ, Bonner Jahrb. 166, 1966, 195, draw attention to Ios. bell. Iud. 3,166, as corroboration. Of course, in the case of Gallus' army, there is no way of knowing how large a complement of artillery each vexillation had brought, and it is worth emphasizing that the conclusion reached in the text is by no means the only possibility. For instance, it is conceivable that artillery of Herodian manufacture was still stored in the Antonia at this date, and that this contributed to Josephus' total.

<sup>55</sup> T. R. S. BROUGHTON, The Roman Army, in: F. J. F. JACKSON and K. LAKE, The Beginnings of Christian-



provision of ordnance for the defence of this small but important Roman enclave in the midst of such a troubled city should not surprise us since the history of Jerusalem under the *praefecti* and *procuratores* is a catalogue of clashes between Romans and Jews<sup>56</sup>.

#### 4 *Phasis (U.S.S.R.)*

This harbour fort situated at the mouth of the river Phasis on the east coast of the Black Sea was surely originally a Flavian foundation. Certainly, the Pontic *limes* as a system appears to date from Vespasian's reorganisation of the north-eastern frontier, although its two termini, Trapezus and Sebastopolis, were Greek cities of great antiquity and the former had been the naval base of the *classis Pontica* since AD 64<sup>57</sup>.

The absence of excavation at Phasis places rather heavy reliance upon Arrian's description of the fort which appears in his 'Periplus Ponti Euxini', a topographical survey of the Black Sea coast written in AD 131/2 while he was consular legate of Cappadocia<sup>58</sup>. The original fort was of earth and timber but, by the Hadrianic period, it had been entirely rebuilt on firm foundations using baked bricks. During his inspection, Arrian himself arranged for the harbour and the neighbouring civilian settlement to be defended by running a ditch from the fort ramparts to the river. Little is known of its subsequent history: whether or not it was garrisoned during the Gothic depredations of the mid-third century, it still housed troops in the reign of Constantine (AD 285–337), since he placed the fort under the command of a *praefectus*, but it is not mentioned in the 'Notitia Dignitatum'<sup>59</sup>.

Arrian records that 400 ἐπίλεκτοι were in garrison at Phasis under Hadrian and, since they were armed with artillery, it is vital that an attempt be made to discover what type of troops they were<sup>60</sup>. Arrian's description of this unit (literally 'hand-picked soldiers') combined with its irregular size have led to its interpretation either as a legionary detachment, such as is found at Trapezus, or as a unit of auxiliary *milites singulares*<sup>61</sup>. The latter is perhaps less likely since, although ἐπίλεκτοι is often

ity 5 (1933) 440, postulates a permanent legionary presence in Judaea, but on slight evidence; the last attested legionary troops to enter Jerusalem prior to the Jewish Revolt were those of P. Quinctilius Varus in 4 BC (IOS. bell. Iud. 2,40; ant. Iud. 17,250–251).

<sup>56</sup> e. g. IOS. bell. Iud. 2,254–265.

<sup>57</sup> On the Pontic limes, see V. A. LEVKINADZE, *Pontijskij Limes*. Vestnik Drevnej Istorii 108, 2, 1969, 75–93; T. B. MITFORD, *Cappadocia and Armenia Minor: Historical Setting of the Limes*, in: ANRW II 7,2 (1980) 1192. – On Phasis, see F. DUBOIS DE MONTPEREUX, *Voyage autour du Caucase* 1 (1839) 65 f.; LEVKINADZE *op. cit.* 79–81. I am grateful to M. SPEIDEL for allowing me to read his forthcoming paper, *The Caucasus Frontier*, delivered at the 13th Limeskongress in Aalen.

<sup>58</sup> ARR. periopl. 9,3–5. On this work in general see P. A. STADTER, *Arrian of Nicomedia* (1980) 32–41.

<sup>59</sup> M. ROSTOVITZEFF, *Röm. Besatzungen in der Krim und das Kastell Charax*. Klio 2, 1902, 95, suggested that the fort was occupied only until the mid-third century. For the fort under Constantine see ZOS. hist. 2,33. Of the forts mentioned by Arrian, only Yssiportus and Sebastopolis appear in the *Notitia Dignitatum* (or. 38,34 and 36); cf. D. VAN BERCHEM, *L'armée de Dioclétien et la réforme Constantinienne* (1952) 31 f.

<sup>60</sup> ARR. periopl. 9,3: τὸ μέντοι φρούριον αὐτό, ἵναπερ κάθηνται τετρακόσιοι στρατιῶται ἐπίλεκτοι . . . ; 9,4: . . . καὶ μηχαναὶ ἐφειστάσιν . . .

<sup>61</sup> BAATZ *op. cit.* (note 4) 197, suggests a legionary vexillation; legionaries are found in garrison at Trape-

synonymous with *singulares*, it is also used in the sense of *vexillarii*, and Arrian's *singulares* are not always referred to as ἐπίλεκτοι<sup>62</sup>. Further, a tile-stamp from this sector of the *limes*, bearing the legend *VEX FA*, may refer to the garrison here; it has been expanded to read *VEX(illationes legionum XII) F(ulminatae et XV) A(pollinarius)*<sup>63</sup>, yet an alternative expansion along the lines of *VEX(illarii) FA(siana)* would make better sense<sup>64</sup>.

The presence of artillery in defence of Phasis is not surprising given its vulnerable position on a coast rife with piracy and brigandage<sup>65</sup>. With the closest support-bases lying about 80 km (50 miles) in either direction, to the north at Sebastopolis and to the south at Apsarus, any garrison based here would surely have been adequately equipped so as not to suffer the same fate as the soldiers at Trapezus in AD 69<sup>66</sup>. However, whether or not the artillery belonged to auxiliaries remains doubtful.

At all of the above four sites, the unit concerned is in some way isolated from the remainder of the provincial garrison and is thus unable to rely on speedy reinforcement in the event of serious trouble. Each represents special circumstances, a fact which we should expect to be reflected in the defensive measures taken to ensure its safety, whether in the midst of a potentially hostile city or on the edge of the civilised world. It is encouraging that the evidence for the arming of auxiliaries with artillery, although generally equivocal, is at least uniform: the ordnance in the above examples was allocated according to the needs of the garrison-post rather than according to the type of garrison-force. Thus, the criterion for the distribution of catapults to units of the *auxilia* appears to be the nature of their bases, and it is therefore doubtful if the general run of auxiliary units were ever entrusted with artillery, given the complexity of operation and maintenance and the tactical implications of these weapons<sup>67</sup>.

It therefore comes as a surprise to read, in a passage from the writings of Arrian on the exercise routine of the Roman cavalry, of the firing of darts 'not from a bow but from a machine'<sup>68</sup>. Such a reference may be taken, at first sight, as proof of the opera-

zus in the second century (CIL III 6745; 6747; AE 1975, 783). – MITFORD *op. cit.* (note 57) 1202, postulates a legionary garrison at Apsarus, but SPEIDEL *loc. cit.* (note 57), has demonstrated that this is unlikely. – H. F. PELHAM, Arrian as Legate of Cappadocia. *English Hist. Review* 11, 1896, 633 f. (reprinted in: F. HAVERFIELD [ed.], *Essays* [1911] 224) and, most recently, SPEIDEL *loc. cit.* (note 57), suggest *singulares*. It is worth noting here that *singulares* do not appear to have been drawn exclusively from the *auxilia*; see D. J. BREEZE, Pay Grades and Ranks below the Centurionate. *Journal Rom. Stud.* 61, 1971, 130 note 7.

<sup>62</sup> M. P. SPEIDEL, *Guards of the Roman Armies* (1978) 49 f. and note 270.

<sup>63</sup> V. A. LEVKINADZE *op. cit.* (note 57) 87 and fig. 9.

<sup>64</sup> For the expansion *vexillarii* from *VEX*, cf. RIB 1538. LEVKINADZE's expansion is also questioned by SPEIDEL *loc. cit.* (note 57).

<sup>65</sup> Brigandage on the eastern Pontic coast is mentioned by a number of authorities, e. g. PROK. aed. 3,6,2; STRAB. 11,2,12; SUET. Vesp. 8,4; ZOS. hist. 1,32.

<sup>66</sup> TAC. hist. 3,47. – ARR. peripl. 9,4, reveals that he is chiefly concerned with denying the approach of enemies and preparing the fort for a possible blockade.

<sup>67</sup> As E. N. LUTTWAK, *The Grand Strategy of the Roman Empire from the First Century AD to the Third* (1976) 45 has pointed out, 'allowing them [viz. the *auxilia*] such weapons would have contradicted the principle of 'escalation dominance'.

<sup>68</sup> ARR. takt. 43,1: ἐπὶ τούτῳ μεντοὶ ἤδη πολύτροποι ἐξακοντισμοὶ γίνονται ἢ κούφων παλτῶν ἢ καὶ βελῶν, οὐκ ἀπὸ τόξου τούτων γε ἀλλ' ἀπὸ μηχανῆς ἀριεμένων. The most recent commentary on

tion of artillery by auxiliaries in the Hadrianic period. However, a brief analysis of the term *μηχανή* with particular reference to the works of Arrian shows how imprecise and inconsistent his usage of this word is.

Out of the fifty or so occurrences of the word in the writings of Arrian, only seventeen can be demonstrated with certainty to mean 'artillery'<sup>69</sup>. A further six instances may tentatively be interpreted as indicating artillery, all in a naval context, for the following reasons: Arrian records that *μηχαναί* were mounted on the Sidonian *hippagogoi* and on the slower triremes during Alexander's celebrated siege of Tyre in 332 BC<sup>70</sup>; he later refers to some of the triremes carrying 'missiles to fire from their engines', thus implying that at least some of these shipborne *μηχαναί* were artillery-pieces<sup>71</sup>; also, Quintus Curtius, largely drawing upon different sources from Arrian for his 'Historiae Alexandri', mentions that Alexander's fleet battered the walls of Tyre with artillery and rams<sup>72</sup>. In these twenty-three instances, Arrian's use of the term is not restricted to any particular artillery-piece; in some cases, it obviously indicates stone-throwers, in others, arrow-shooters, and in still others, by far the most common, it is not clear whether the one or the other (or a combination of both) is intended. Only twice is he specific, in both cases referring to a *καταπελτής* (arrow-firing engine)<sup>73</sup>.

It is appropriate to mention here the shipborne *μηχαναί* which were used to clear the waters around Tyre of the stones which hindered the approach of Alexander's fleet<sup>74</sup>. The relevant passage of Arrian is open to several different interpretations and it was long thought that the stones were disposed of by *ballistae*, however it seems more probable that the engines in question were cranes<sup>75</sup>. Parallels for the use of this term to indicate a crane may be found elsewhere in Greek literature, while such apparatus is by no means uncommon on shipboard<sup>76</sup>. Thus, the operation seems to have

Arrian's *Taktika* is F. KIECHLE, *Die 'Taktik' des Flavius Arrianus*. Ber. RGK 45, 1964, 87–129; regarding this passage, he simply states: 'Katapulte wurden in der Kaiserzeit nicht mehr nur im Belagerungskrieg verwendet . . . Arrian stellte sie zur Abwehr der Alanen hinter den Flügeln der Phalanx auf' (p. 103, note).

<sup>69</sup> I have located only 55 instances of the use of this term by ARRIAN; some form of artillery is obviously intended in: Alan. 19; 25; anab. 1,6,8; 1,22,2; 2,18,6; 2,23,3; 3,18,3; 4,2,3; 4,4,4; 4,26,5; 4,27,2; 4,29,7; 4,30,1; 7,10,2; Ind. 24,7; peripl. 9,4; takt. 43,1.

<sup>70</sup> ARR. anab. 2,21,1; L. CASSON, *Ships and Seamanship in the Ancient World* (1971) 93 note 82, accepts these as catapults.

<sup>71</sup> ARR. anab. 2,23,3: *ἄσαι δὲ αὐτῶν βέλη ἀπὸ μηχανῶν βαλλόμενα εἶχον*. It ought to be these same engines that are mentioned at 2,21,2.3.4; 2,22,6; 2,23,1.

<sup>72</sup> CURT. 4,3,13; DIOD. 17,43,4 describing the same engagement, records only 'engines of all kinds'. Admittedly, none of these is a contemporary account, but I have assumed throughout that the usage of the term *μηχανή* is an abbreviation of an originally more explicit reference in the primary sources; only thus can we hope to identify Arrian's many 'machines'. The most recent discussion of the primary sources used by Arrian, Diodorus and Curtius is W. HECKEL's introduction to: Quintus Curtius Rufus: *The History of Alexander*, translated by J. YARDLEY (1984).

<sup>73</sup> ARR. Alan. 5; anab. 2,27,2.

<sup>74</sup> ARR. anab. 2,21,7.

<sup>75</sup> For their interpretation as artillery, E. ILIFF ROBSON, *Arrian* 1. Loeb Classical Library (1946) 203; E. W. MARSDEN, *Greek and Roman Artillery. Historical Development* (1969) 102 f.; A. B. BOSWORTH, *A Historical Commentary on Arrian's History of Alexander* 1 (1980) 248. For their interpretation as cranes, J. F. C. FULLER, *The Generalship of Alexander the Great* (1958) 213; A. G. DRACHMANN, *Review of MARSDEN op. cit.* in: *Technology and Culture* 11, 1970, 622.

<sup>76</sup> DIOD. 1,63,6; HDT. 2,125; cf. VITR. 10,2,10, where two types of crane (designated throughout as *machinae*) are installed on merchantmen for loading and unloading purposes. See J. G. LANDELS, *Engineering in the Ancient World* (1978) 94–96.

involved the lifting of the stones from the piles in which they had accumulated and the redepositing of them onto the sea bottom in order to create sufficient draught for the ships to reach the city walls<sup>77</sup>.

Of the remaining thirty-odd appearances of the term in the writings of Arrian, most simply indicate siege-engines in general, from ladders to battering-rams and mobile towers. Indeed, throughout the millennium from Thucydides to Procopius, this word is used indiscriminately to indicate various warlike contrivances, sometimes singly, sometimes in mixed groups. Thucydides covers a multitude of devices with this one word, from the scaling-ladders which would have enabled Cleon to capture Amphipolis in 422 BC, to the crude but ingenious flame-throwers used against the timber fortifications of Delium and Lecythus in 424/3 BC<sup>78</sup>. Procopius uses the same term to indicate substantially the same sort of equipment as does Arrian; he even refers to the simple *stoa* constructed by Belisarius for the siege of Urbino in AD 539 as a 'machine'<sup>79</sup>. The one conclusion to be drawn from this short analysis is that *μηχανή* implied to a Greek-speaking audience any contraption used in warfare, so its appearance in 'Tactica' 43,1 need not imply that the auxiliaries under Arrian's command were using catapults. Indeed, on further reflection, it is difficult to imagine how cavalry on manoeuvres could possibly have operated these. Although it is not explicitly stated, it is clear from the context and from the sequel that this exercise was performed mounted: the preceding passage deals with the *Xunema*, or the throwing of lances while at full gallop, and the following passage deals with the charging of the troopers with couched lances and slashing swords. The 'machines' in question cannot therefore have been catapults like those on Trajan's Column nor, since they are described as firing darts, can they have been any of the other 'machines' mentioned above; more probably, they were some kind of small mechanical arms.

Weapons of this type were certainly known to the ancients, although the evidence for their use in the Roman army is slight. Two Gallo-Roman reliefs of hunting-scenes dating from the second or third century AD depict small non-torsion crossbows<sup>80</sup>, thus proving that such weapons existed at that time although not necessarily in the military sphere. The suggestion that they regularly appear in the sources as *scorpiones* has little to recommend it<sup>81</sup>; despite the testimony of Vegetius, there is no reason to suppose that earlier writers used the term *scorpio* to refer to anything other than a static arrow-firing artillery-piece<sup>82</sup>. However, three types of hand-held mechanical weapons are mentioned by ancient writers.

<sup>77</sup> P. A. BRUNT, Arrian 1. Loeb Classical Library (1976) 199, appears to favour the 'crane' hypothesis, but he is surely mistaken in taking ἀπὸ τοῦ χώματος to mean 'from the mole'. The operations were carried out from ships (2,21,5) which were already in deep water (cf. 2,18,3), so χώμα must refer to the heap of boulders, cf. HDT. 9,85. The stones at Tyre need not have been particularly large, contra BOSWORTH *loc. cit.* (note 75), only numerous enough to form a troublesome obstacle.

<sup>78</sup> For the 'machines' at Amphipolis: THUK. 5,7,5. On the flamethrowers, which basically comprised a cauldron of coal, sulphur and pitch, attached to large bellows via a lead-lined pipe: THUK. 4,100; 4,115,2–3. Other 'machines' also occur at THUK. 2,76,4; 2,77,1; 3,51,3; 7,43,1.

<sup>79</sup> PROK. bell. 6,19,15; cf. 19,6–7 for a description of the *stoa*.

<sup>80</sup> E. ESPÉRANDIEU, Recueil général des bas-reliefs de la Gaule romaine 2. Aquitaine (1908) 442–444, no. 1679 (Salignac) and 1683 (Saint-Marcel).

<sup>81</sup> This is suggested by DRACHMANN *op. cit.* (note 75) 622.

<sup>82</sup> There is evidently some confusion in late sources over the technical names for the various artillery

## 1 *Gastraphetes*

This weapon is described by the Alexandrian writer, Heron, in his 'Belopoeica', for which he probably used an original third century BC source<sup>83</sup>. It was a powerful composite bow mounted on a stock, the rear end of which had a crescent-shaped rest so that the weapon could be comfortably braced against the archer's stomach. The stock carried a slider of the same length with a central groove on top for the missile to lie in. When the *gastraphetes* was at rest, the slider projected beyond the stock, and the bow-string could easily be caught by a hooked trigger-mechanism at the end of the slider. In order to span the weapon, the archer pushed the slider against a wall or the ground, bracing the stock against his stomach. As the slider became flush with the end of the stock, it drew back the bow-string. A rack-and-pawl device held the slider in position once the bow was fully spanned, and the trigger released the taut bow-string from the hook, thus firing the missile.

Obviously a horseman could not have used a *gastraphetes* since the archer was required to brace it between his body and an immovable object such as a tree or a wall; a horseman could not rely upon being near one of these every time he had to use the weapon. However, a later development of the *gastraphetes* seems to have seen the introduction of a winch pull-back system allowing the exertion of theoretically unlimited pressure where before the archer had to rely upon his own strength and weight. Such a winch features in the *gastraphetai* attributed to Zopyrus of Tarentum by the writer Biton, who compiled his work under the auspices of one of the Attalids of Pergamon (i. e. some time between 241 and 133 BC, and probably nearer the former than the latter), although both of his machines were mounted on bases<sup>84</sup>. Heron too mentions a winch, but only after his discussion of early torsion artillery<sup>85</sup>. Of course, this should not be taken as proof positive that the addition of the winch post-dated the introduction of either the base or the torsion principle<sup>86</sup>. Nevertheless, if hand-held, the developed *gastraphetes* would have been very heavy and the rate of fire very low.

## 2 *Cheiroballistra*

This weapon is described in a text formerly attributed to the same Heron who wrote the 'Belopoeica', but it seems more probable that the date of composition is considerably later<sup>87</sup>. The text is notoriously difficult to interpret; indeed, one scholar went so

pieces. Thus, although VEG. mil. 4,22 states that *scorpiones dicebant quas nunc manuballistas vocant*, AMMIANUS MARCELLINUS, no more than a generation earlier, speaks of [*scorpio*] *quem appellant nunc onagram* (23,4,4). Nevertheless, in earlier sources, the word is exclusively applied to arrow-firing field-artillery (e. g. CAES. Gall. 7,25,2-3; HERON bel. W74; LIV. 26,6,4; PLIN. nat. 7,41; SEN. nat. 2,16; VITR. 1 praef. 2; 10,10,1) occasionally indicating small size (e. g. VITR. 10,1,3).

<sup>83</sup> C. WESCHER, *La poliorcétique des Grecs* (1867) 75-81; text and English translation, E. W. MARSDEN, *Greek and Roman Artillery. Technical Treatises* (1971) 20-23 and 44-47 (commentary).

<sup>84</sup> WESCHER *op. cit.* 61-67. Text and English translation, MARSDEN *op. cit.* 74-77 and 98-103 commentary. On the date of Biton, see MARSDEN *op. cit.* 78 note 1.

<sup>85</sup> WESCHER *op. cit.* 86; MARSDEN *op. cit.* 26 f.

<sup>86</sup> E. W. MARSDEN, *Greek and Roman Artillery. Historical Development* (1969) 14.

<sup>87</sup> WESCHER *op. cit.* (note 83) 123-134; text, commentary and English translation, MARSDEN *op. cit.*

far as to suggest that it did not refer to a weapon at all but, on the contrary, was an extract from a lexicon describing eight separate inventions all beginning with the letter K<sup>88</sup>. Nevertheless, with the discovery of the artillery-components from the *quadriburgium* at Gornea in Rumania, which conform very closely to the hitherto neglected text-diagrams, it is clear that the *cheiromballistra* was a hand-held torsion weapon which saw active service during the fourth century AD, if not before<sup>89</sup>. Indeed, it was probably identical, on etymological grounds, to the *manuballista* mentioned in late Roman sources<sup>90</sup>.

Like the *gastraphetes*, it appears to have had a crescent-shaped rest at the end of the stock and, in the absence of a winch, must have been spanned in a similar manner<sup>91</sup>. But unlike the *gastraphetes*, the *cheiromballistra* was a torsion weapon: the three iron field-frames (καμβέστρια) from Gornea (Rumania) and four small washers (χοινοκίδες = *modioli*), one from Ephyra (Greece), one from Bath (England), and two from the shipwreck at Mahdia (Tunisia), originated from similar weapons<sup>92</sup>. Instead of using a bow to provide the power, the twin arms were inserted into vertical skeins of sinew or hair which formed torsion-springs. When the bow-string was drawn back (in a similar manner to the *gastraphetes*), the movement of the arms twisted the springs, thus storing up energy for the shot. When the bow-string was released, the pressure on the springs was suddenly relaxed and the arms would shoot forward to their previous position, thus propelling the missile. The function of the field-frames was to hold these springs, the cords of which were stretched between two iron bars or levers (ἐπιζυγίδες), at the top and bottom. Each lever rested upon a washer and by turning these, the springs could be tightened; the washers were locked in place to avoid the springs slackening while the catapult was being used. The Mahdia examples show a different locking method from the Ephyra and Bath washers, which each have six equidistant holes on their outer flange through which a retaining-pin would have been slotted; the Mahdia washers each have a series of thirteen shallow notches on the underside which must have acted as a ratchet. Since this arrangement is obviously

(note 83) 206–233; German translation and text-diagrams, D. BAATZ in: N. GUDEA and D. BAATZ, *Teile spätröm. Ballisten aus Gornea und Orșova (Rumänien)*. Saalburg-Jahrb. 31, 1974, 69–72. On the dating of this text see D. BAATZ, *Britannia* 9, 1978, 14 contra MARS DEN *op. cit.* (note 83) 209, although the artillery-type dates back to the Trajanic period.

<sup>88</sup> R. SCHNEIDER, *Hérons Cheiromballistra*. *Röm. Mitt.* 21, 1906, 142–168; almost thirty years previously, it had been demonstrated that the *cheiromballistra* was an artillery-piece: V. PROU, *La Chiroballiste d'Héron d'Alexandrie*. *Notices et extraits des manuscrits de la Bibliothèque Nationale et autres bibliothèques* 26,2, 1877, 1–319.

<sup>89</sup> D. BAATZ, *Saalburg-Jahrb.* 31, 1974, 66 f.; the basic design of the *cheiromballistra* can be seen on Trajan's Column, where it appears as field-artillery: MARS DEN *op. cit.* (note 86) 189 f.

<sup>90</sup> *VEG. mil.* 2,15; 3,14; 4,21–22; ANON. *de reb. bell.* 16,5. βαλλίστρα is the Greek form of the Latin *ballista* in late Roman and Byzantine times; the Greek χεῖρ is the equivalent of the Latin *manus*. I cannot agree with B. S. HALL, *Crossbows and Crosswords*. *Isis* 64, 1973, 531, who suggests that the *manuballista* was not a hand-held weapon.

<sup>91</sup> D. BAATZ, *Saalburg-Jahrb.* 31, 1974, 61 *contra* MARS DEN *op. cit.* (note 83) 218 note 4, where the crescent-shaped piece is taken to be a hand-grip for manoeuvring the weapon on a tripod-base, and 219 note 6, where a windlass is reconstructed without evidence.

<sup>92</sup> D. BAATZ, *Saalburg-Jahrb.* 31, 1974, 66 f. (Gornea); IDEM, *Athen. Mitt.* 97, 1982, 221f. and fig. 1, 6 (Ephyra and Bath); IDEM, *Arch. Anz.* 1985, 680 ff. (Mahdia).

less satisfactory, it has been suggested that these washers were already antiquated when they were deposited<sup>93</sup>.

The Ephyra washer was found buried in the debris of a tower destroyed in 167 BC, and the Mahdia ship sank some time in the first half of the first century BC; the Bath washer must have been deposited some time within the four centuries of Roman presence in Britain. The field-frames from Gornea were discovered in the fourth-century destruction layer of the *quadriburgium* which had been occupied since the period of the Tetrarchy (AD 294–305). Thus, this type of weapon clearly had a long history, but nothing is known of its development between the second century BC and the fourth century AD. Clearly, the weapons represented by the Ephyra and Mahdia finds must have been rather different to the *cheiromballistra* since the latter was a development of the first century AD; earlier torsion weapons still had wooden frames and must have been of euthytone construction rather than palintones.

At any rate, the likelihood of the Roman army using the *cheiromballistra* is rather greater than the *gastraphetes*, but when we attempt to identify it with Arrian's 'machines', the same problem as with the *gastraphetes* obtrudes again: the *cheiromballistra* and, by inference, the *manuballista* are both belly-bows and are thus useless to a cavalry-trooper.

### 3 *Arcuballista*

The sole mention of the *arcuballista* occurs in the work of Vegetius, and its precise nature is therefore not at all clear; he records its use in battle by *tragularii* positioned behind the front rank<sup>94</sup>. Its name indicates that it incorporated an *arcus*, but whether this refers to the bow of a non-torsion weapon or to the arched-strut (καμάριον = *arcus ferreus*) of a torsion weapon cannot be said. Marsden was of the opinion that it was a non-torsion weapon<sup>95</sup>, but his reasoning was never stated explicitly and, in the absence of a detailed treatise to compare with Heron's 'Belopoeica' or the *cheiromballistra* text, this can be no more than a guess<sup>96</sup>.

Thus, we return to the crossbows depicted on the Gallo-Roman reliefs from Salignac and Saint-Marcel<sup>97</sup>. These are obviously not belly-bows since they lack the distinctive crescent-shaped stomach-rests which characterize such weapons. Nor is there any sign of a winching mechanism for spanning the bows, which appear to be composite, or at any rate non-torsion. Perhaps such weapons (are these the elusive *arcuballistae*?) could be used by mounted archers.

In attempting to identify Arrian's 'machines', one other piece of evidence remains to be considered, namely the description of Julian's task-force mustered against the Alemanni in AD 356; Ammianus describes it as comprising 'heavily-armoured cavalry

<sup>93</sup> D. BAATZ, *Arch. Anz.* 1985, 689 and 691.

<sup>94</sup> VEG. *mil.* 2,15; 4,21–22.

<sup>95</sup> MARSDEN *op. cit.* (note 86) 2; 63 and 195. – MARSDEN *op. cit.* (note 83) 6.

<sup>96</sup> The view of B. S. HALL *loc. cit.* (note 90), that 'the *arcuballista* was a torsion engine descended from the *cheiromballistra*', is unproven.

<sup>97</sup> See above, note 80.

and artillery-men<sup>98</sup>. One would naturally assume that the *ballistarii* were mounted in order to keep pace with this rapid mobile force and the possibility exists that they were armed not with the conventional torsion *ballistae*, dismantled for the journey and intended to be used only at the destination, but with hand-held weapons. Certainly, these are unlikely to have been *gastrophetai* or *cheiroballistrai* for the reasons suggested above, but there is nothing inherently improbable in the suggestion that Julian's *ballistarii* used a weapon related to those shown on the Gallo-Roman reliefs. On present evidence, however, this can be no more than a suggestion.

It is interesting that all of our evidence for small mechanical arms has hitherto clustered at either end of the chronological scale. This can no longer be taken to indicate a period during which small hand-held artillery fell out of use, since Arrian's 'machines' are obviously some form of *ballistae*, perhaps even *arcuballistae*<sup>99</sup>. At present, although the evolution of such weaponry is not clear, it seems probable that hand-held mechanical arms were used continuously from the third century BC through to the Byzantine period.

The tantalizingly brief reference to such weapons in Arrian's 'Tactica' is doubly problematical: were the 'machines' intended only as practice weapons or were they standard issue in the field, and were they used outside of Hadrian's reign or were they confined to the mid-second century? Certainly, Hadrian's penchant for military innovation is well known, and there is even mention in the 'Tactica' of various cavalry manoeuvres which he had introduced<sup>100</sup>. Indeed, Arrian's wording suggests that his readers would not normally have expected the use of 'machines' in this context, but it is not clear whether this means that the novelty was in issuing them to auxiliaries, or that the novelty was in their use as practice weapons. In conclusion, Arrian's testimony stands as evidence not only of the use of small mechanical arms by the Roman army as early as the principate of Hadrian, but of their use by auxiliaries, who do not appear to have been entrusted with field artillery under normal circumstances.

<sup>98</sup> AMM. 16,2,5.

<sup>99</sup> D. SCHENK, Flavius Vegetius Renatus: Die Quellen der Epitoma Rei Militaris. *Klio*, Beih. 22 (1930) 23, suggested that Vegetius' source for book 2 was Taruttienus Paternus; the *arcuballistarii* and *manuballistarii* would then derive from the mid-second century. However, SCHENK's arguments are by no means conclusive.

<sup>100</sup> ARR. takt. 44,1-2; cf. Hist. Aug. Hadr. 10 passim, especially 7: *arma postremo eorum supellectilemque corrigeret*; 14,10: *idem armorum peritissimus et rei militaris scientissimus, gladiatoria quoque arma tractavit*. - VEG. mil. 1,8 and 27, includes the *constitutiones* of Hadrian in his list of sources for the exercise routine of the army.