ISSN 0961-3684

JOURNAL OF ROMAN MILITARY EQUIPMENT STUDIES

VOLUME 12/13 2001/2

Klivanion revisited: an evolutionary typology and catalogue of Middle Byzantine lamellar styles

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In times past conventional wisdom has held that Byzantine art was relentlessly circumscribed and stylised, and that it therefore has little value as source material for anything other than analyses of iconographic formulae. This view was propounded by some of the most eminent Byzantinists of that past era and still remains somewhat influential. The area where this dictum breaks down mostevidently is in the depictions of military equipment, especially on portraits of military saints. As I have discussed elsewhere, notwithstanding famous but actually quite unusual examples like the 'Joshua Roll' in the Vatican Library, which are indeed highly stylised,[1] there are numerous works of the tenth to twelfth centuries which can be shown to carry high levels of realistic precision.[2]

This article is an adjunct to my previous article, 'Kremasmata, Kavadion, Klibanion: some aspects of middle Byzantine armour reconsidered'.[3] In that article I sketched a process which brought about distinctively Byzantine innovations in lamellar armour construction which first created 'banded' lamellar in which the plates are attached side-by-side to a backing that usually projects at the top, and which then came to employ riveting as a manufacturing shortcut.[4] Here I aim to assemble a catalogue of depictions and archaeological survivals of lamellar from the 10th to 13th centuries, and to show how these depictions can help define the process of evolution in the methods of construction used in lamellar armour produced in Constantinople and nearby centres.[5] I make this geographical proviso because, even in the diminished form of the 10th to 12th centuries, Romania (as contemporary sources call the Eastern Roman Empire[7]) still retained considerable diversity, and a distinct technological and economic gradient between the metropolis and hinterland.

The beginning point of this evolutionary process in Roman lamellar is problematical. Lamellar armour was certainly in use in the east Roman army in late antiquity.[8] However the tribulations that the empire suffered from the early 7th century onwards cast a pall over our subject as much as any other area of life. Even the *Strategikon* of Mavrikios/Urbikios makes no obvious reference to this form of armour. We are then left speculating about a possible marginalisation, if not disappearance, of lamellar, and its revival some time prior to the beginning of the 10th century.

It is well established that the east Roman army inherited a long and widely dispersed tradition of lamellar manufacture. This tradition employed a remarkable diversity of plate forms and lacing patterns,[9] but two characteristics are fundamental. Most importantly for our discussion, in all the traditional forms, (I shall henceforth designate them collectively as 'generic' or 'G') the lames overlap each other horizontally and are tied directly to their neighbours. (Fig. 1) The other characteristic is the distinction between 'solid laced lamellar', where the rows are joined vertically with little capacity for movement, and 'hanging lamellar', where the rows are suspended loosely and can have a significant amount of vertical flexibility. Bengt Thordeman's seminal survey has shown that solid lacing was the earlier form, prevalent across the Near East in antiquity and surviving into the 20th century in some areas. From the bginning of the middle ages the most prevalent form was hanging lamellar suspended by one lace on the centre of the plate. This type, generic hanging lamellar, is the starting point for the evolution of middle Byzantine lamellar.

Modes of production necessarily had a pervasive influence on the evolutionary process. In the earlier Roman Empire the supply of arms and armour was somewhat decentralised and the equipment therefore diverse.[10] Diocletian initiated the construction of up to forty imperially managed *Fabricae*. Under such a system changes in equipment would take effect relatively quickly and homogeneously across the empire.[11] Treadgold suggests that a reasonable centralised system prevailed to about the mid-9th century.[12] So it appears that for the period we are most concerned with here, military procurement and production had again become both geographically decentralised, and more variable in who commissioned and purchased equipment. According to the system of *Pronoia*, those holding military lands were obliged to provide a soldier or soldiers, and also, where possible, panoply and mounts. Thus, a portion of the arms and armour in use in armies of the 10th to 12th centuries must have been of somewhat individual style – some incorporating the latest innovations the prospective wearer took a liking to, and others holding to tried and true forms, while both tendencies were influenced by the funds available. A certain amount of General Issue armour was produced in some quantity, but in dispersed regional localities under the supervision of provincial *Stratēgoi* or *Doukes*, rather than under imperial control.[13] By the same principle as with personal harness, the speed and extent to which this GI armour absorbed technological innovations would also vary according to the disposition and resources of local commanders. Men in those positions may have been more likely to be influenced by developments implemented in the capital (a

likely source for many innovations) than individuals merely acquiring armour for themselves, yet even that tendency must have been mitigated by the distance from the source.

As indicated above, the starting point for the evolution of Middle Byzantine lamellar is hanging lamellar suspended by one lace on the centre of the plate, 'Generic, three lace', type G3. A damaged plate of this form was found at Birka.[14] This plate must date from no later than the 970s when the town finally ceased to be a primary trading centre and wassoon abandoned.[15] Birka had strong links to the south east and especially Byzantium, so Byzantium is a likely source for this plate or its progenitors.[16] Plates of this form can be assembled laced one to another in rows according to the familiar method, as in Fig. 2.

Type G3 survives in 11th century Byzantine depictions in Cappadocia, as noted in the catalogue. The persistence of this form on the eastern margin of the empire can be attributed to its remoteness from the centre of innovation at the capital, perhaps combined with a degree of cultural permeability and cohesion across the border which helped keep Cappadocian practice in line with broader regional norms.

The first distinctively Byzantine innovation taking lamellar construction away from the generic forms was 'Banded, three lace', type B3 (Fig. 3) In this type we have the characteristic most prevalent in 10th to 12th century Byzantine representations of lamellar – the full curvature of the plate top is visible, laid against a plain band which cuts acrss the vertical edges of the plates. Rather than being an artistic convention, it is my contention that this accurately reflects the form of construction. Instead of the plates being laced to one another overlapping horizontally, they are laced abutting to a leather backing which protrudes a little at the top, thereby producing the 'banded' appearance. One can see with a glance at the separated plate that this change required *no* alteration in the punching pattern of the plate, and essentially none in the lacing pattern.

Yet this change has some significant constructional advantages. There is a major saving in materials, and hence weight – in the type G3 to type B3 change on this plate the saving is no less than 40% of area. Where the plate material is metal – iron or bronze – the savings in weight and labour are particularly significant. In the case of horn, as mentioned by Leo the Wise in his *Taktika*, there could also be a significant decrease in the bulk of the armour. A *klivanion* constructed thus would also be less rigid, and so require less precision in the curvature of the plates. It would also require less precision in the placement of the side holes.

The prevalence and period of dominance of type B3 is hard to assess. The only surviving depiction is a steatite icon attributed to the 12th century nowadays held in the Kiev City Museum.[17] The place of production of this icon is, of course, unknown, so we are left speculating about some regional centre where this form of construction may have been preserved, as G3 appears to have been in Cappadocia.

It will seem at first sight that lamellar constructed thus must be much more vulnerable to thrusts (particularly spear thrusts) slipping between the plates than the generic form. In practice there is not so much of a difference, for the amount of lateral movement in the plates is small. Even in the rare chance that the angle of the blade is perfectly aligned with the edges of the plate, the pressure of the plates tends to bind even a thin blade.[18] In addition, since the lamellar is double layered, a blade which does manage to penetrate the outer layer must also find a corresponding gap in the inner layer. Such a corresponding gap is theoretically immediately behind, but due to the flexibility of the construction, and the vagaries of blade angle, the chances of the blade finding the gap are extremely small. Should that minuscule chance come about, the blade then confronts the same binding tendency again.

Yet this vulnerability, however slight, might still have prompted experiments to alleviate it by offsetting the rows (Designated ^{O} in the typological code), hence type B3^{O} (Fig. 4). This form does necessitate an increase in labour. Three more holes, each alternate row requires one or two half-width plates to complete the row, and the rows must be assembled accordingly with a little more care. This would account for its rarity, and probable short span of use. This type survives in just one depiction, dated to the early 13th century. The dating of this picture, if accurate, is problematical, for the heyday of this type ought to have been no later than the mid to late 10th century, yet we do not know what source the artist used as his inspiration. It may have been a very much older picture.

Another reason to assign type B3^{O} to the 10th century is that it could mediate what would otherwise be the greatest change in the depiction of metropolitan Byzantine lamellar. The altered lacing allocations of type B3^{O} to a central binding and two suspension laces, is the same mode as 'banded, two lace, riveted', type B2r^{O}/B2r (Fig. 5 and 6), which is first evident in surviving sources at the turn of the eleventh century in the *Psalter of Basil II*.[19] The stripe or bar at the top of the plate which indicates the lower attachment of the suspension lace in all the previous types is replaced by a dot, which is especially well rendered in soapstone icons. I suggest that the circle or dot represents a rivet holding the plate to the backing, accompanied by two suspension laces near each edge, and infer that there would be a corresponding rivet at the bottom of the plate. The two lateral holes at the bottom can also take an additional suspension lace each, one from the row above and one to the row below. Being fully internal and so protected, these laces would dramatically improve the durability of the armour.

Providing some further support to the link from type B3^{O} the offset form, type B2r^{O}, is by far the most commonly illustrated type across the sources. The same plate can be assembled in line, and is shown so, but would understandably be a less favoured expedient due to the somewhat lesser protection it offered.

As the catalogue reveals, type B2r^{O}/B2r are the most common of all lamellar depictions, and especially prevalent in the 11th century. Moving from lacing to riveting simplifies and speeds production for type B2r^{O}/B2r has two less holes than the laced type B3, and no less than five fewer holes than type B3^{O}. It also increases durability, reducing the possibility that a plate might become detached from the backing as a result of cut binding laces.

There has been one find of lamellar armour which has impeccably Byzantine credentials. Pieces from what must have been a full *klivanion* found amongst the ruins of the Great Palace and persuasively assigned to the Fourth Crusade destruction layer. These pieces have not yet been properly studied, but the description given in the published report indicates a form fully consistent with the type B2r plates depicted above.

> ... where the whole piece was found, the length was approximately twice the width. All were pierced with holes

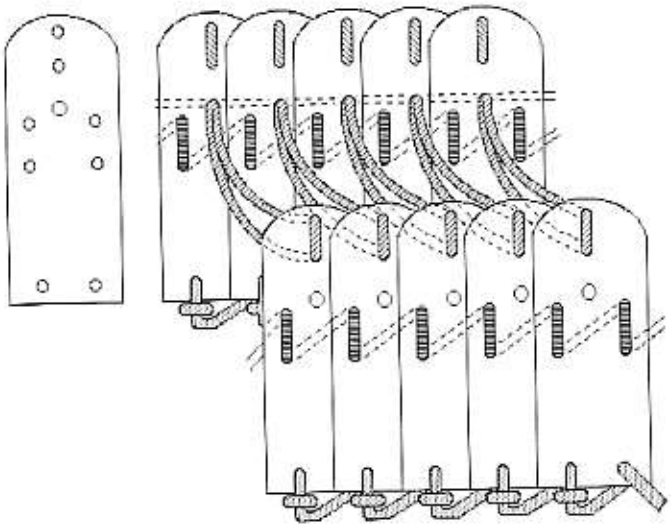

Fig. 1: exploded diagram of generic hanging lamellar construction.

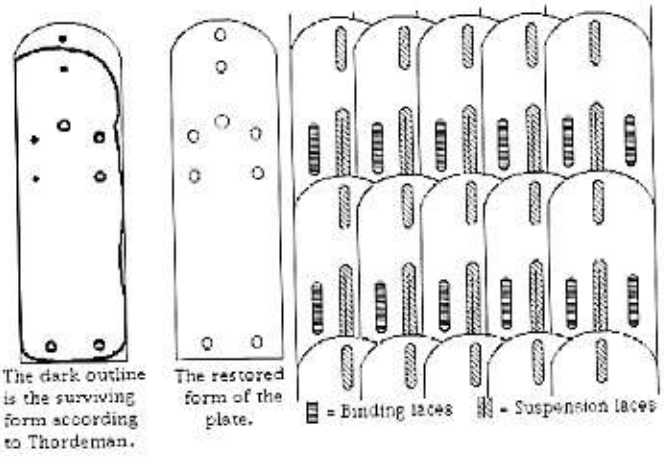

Fig. 2: the Birka lamellar reconstructed in generic form – type G3

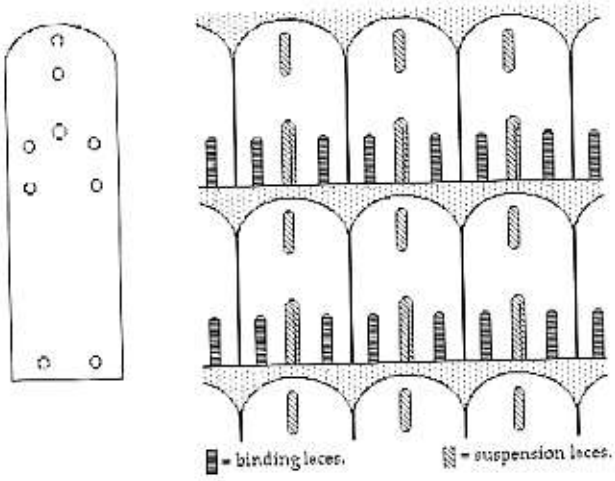

Fig. 3: the Birka lamellar reconstructed in banded form – type B3.

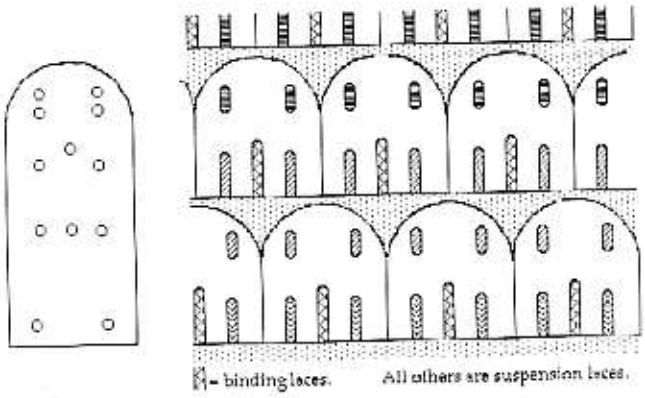

Fig. 4: Type B3[0].

for attachment; the regular arrangement was three along one end, one on the other, and two along each side.[20]

The dark outline on the single plate in Figures 4 and 5 represent one separated plate fragment with holes from this find. An attempt has been made to reconstruct these plates in generic form by Peter Beatson.[21] I believe this fails on several points. The side hole placement on these plates means that generic construction sacrifices almost half the width of each plate, whereas they are precisely placed to allow both offset and in-line riveted construction. In addition, Beatson's reconstruction took into account the banded character of Byzantine depictions of lamellar, and attempted to incorporate that feature by means of a leather binding at the top and bottom of the row, yet that method obscures the other feature of depictions — visible top curvature of the plates. As that author observes, a new examination of the original material by a specialist is needed to shed further light upon this question.[22]

The type B2r forms can be seen to have a couple of weaknesses which account for the appearance of rarer derivatives. Having just two rivets on the centre line of the plate does leave some potential for a thrust coming from an acute angle to penetrate by lifting the edge of a plate from the side. This possibility is reduced by the type B2r2 (Fig. 7). This type first appears virtually simultaneously with type B2r[0] on the portrait of Ioannès, an Armenian *Prōtospatharios* at the court of Basil II in a manuscript explicitly dated 1007.[23] Again, for greater proof against penetration between the plates the offset type B2r2[0] is a hypothetical possibility (Fig. 8), although there appear to be no surviving depictions of this type. The advantages of the in-line form (type B2r2) may have been thought to be sufficient by its users.

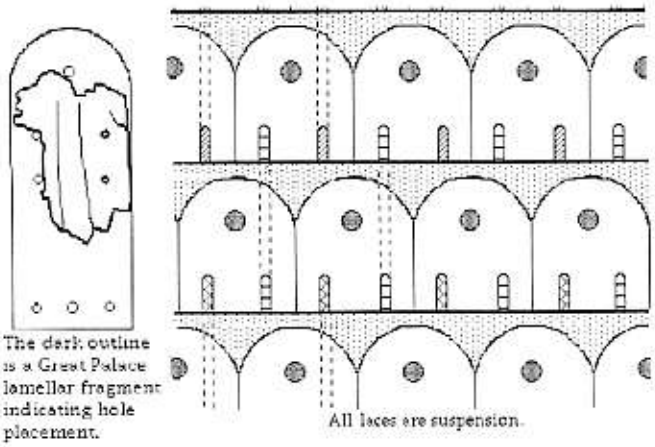

Fig 5: Type B2r^{O}.

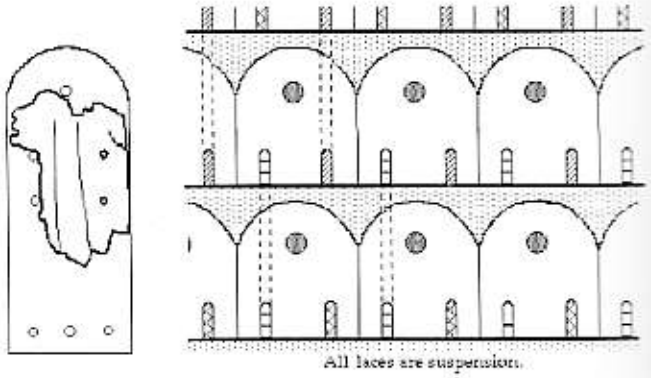

Fig. 6: Type B2r.

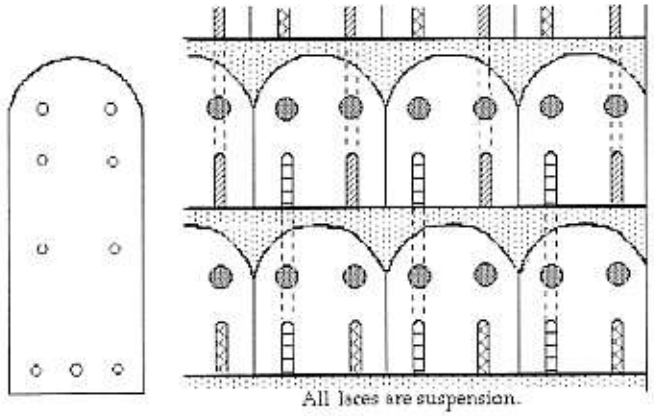

Fig. 7: Type B2r2.

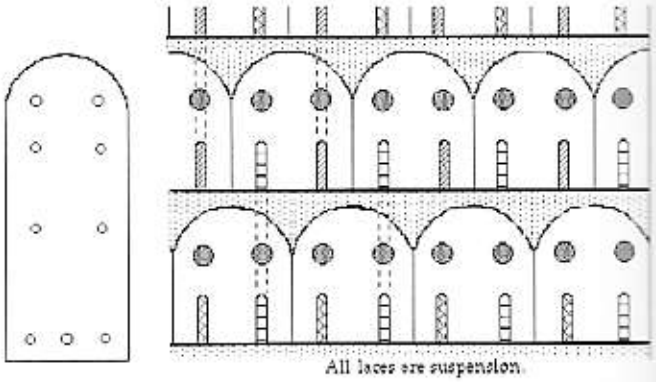

Fig. 8: Type B2r2^{O}.

Although type B2r and type B2r2 have the double redundancy of internal suspension laces, it is possible that a horizontal cut or glancing thrust could have the effect of severing ties both upward and downward on the outer layer. The aim of reducing this possibility may have prompted the introduction of the type B4r^{O}/B4r in the late 11th century (Fig. 9 and 10). As with type B2r^{O}/B2r, the offset form is more prevalent. The suspension laces could be paired or alternated. The multiplication of laces tied off inside could also serve to slightly reduce the plate lifting by acute angle thrusts which prompted the creation of type B2r2 out of type B2r.

In practice, the two weaknesses in the type B2r which type B2r2 and type B4r were designed to remedy both relate to relatively rare occurrences, which could be seen not to justify the additional labour and hence cost, especially in munition *klibania*. Such an economic consideration could explain the continuity of type B2r^{O}/B2r through to the radical upheaval of 1204 which appears to mark the end of Byzantine lamellar construction on any scale. Figure 11 summarises the plate forms in their likely temporal sequence, while Fig. 12 presents a hypothetical time line their durations of use.

THE CATALOGUE

In assembling the catalogue, I have generally relied upon the currently accepted dates of the artworks cited. Yet a *caveat* must be applied. It is important to note that the dating of artworks which have no date recorded upon them or with them is normally founded upon 'stylistic analysis'. That is to say that the prevailing group of art historians of a given era agree amongst themselves that a work of art looks like some other work or group of artefacts of which they believe they know the date. Any such assessment is always open to revision, and sometimes quite spectacular revision, as we have seen, for example, with the Madrid Skylitzes, which went from '*c.* 1300' to '*c.* 1150'.

The catalogue does not contain every depiction of lamellar I have seen. Some are so sketchy that it is impossible to guess which type of lamellar construction was the model. In addition, while I believe that most of the artists did base their work upon real items, they were not setting out to make technical drawings and so many pictures have diverse elements. In particular one frequently sees both in-line and offset plates in the same harness. In that case I have assigned the *klivanion* to which ever category seems to be dominant.

Type G3

Fresco, Hidden Church, Gšreme, C11th.[24]

Type B3

Saint, steatite icon, Kiev City Museum, C12th.[25]

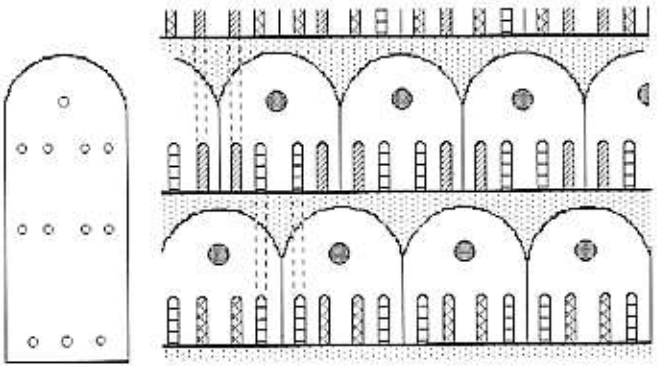

Fig. 9: Type B4r^{o}.

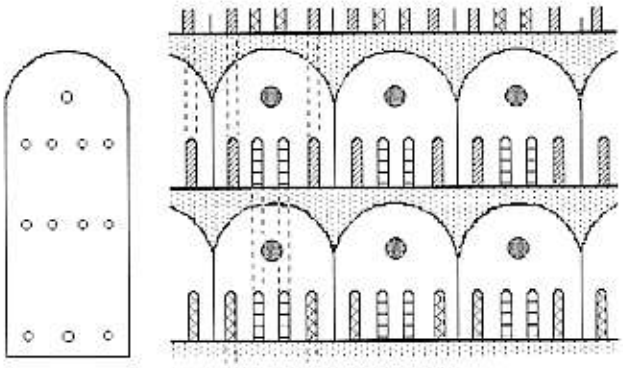

Fig. 10: Type B4r.

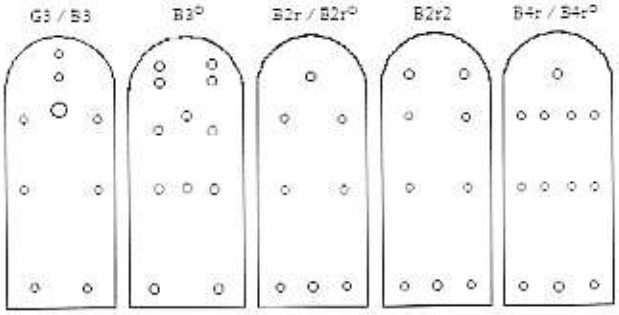

Fig. 11: Summary of plate forms.

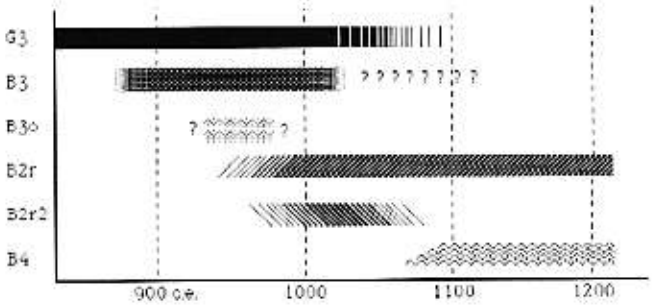

Fig. 12: Hypothetical timeline of Byzantine lamellar types.

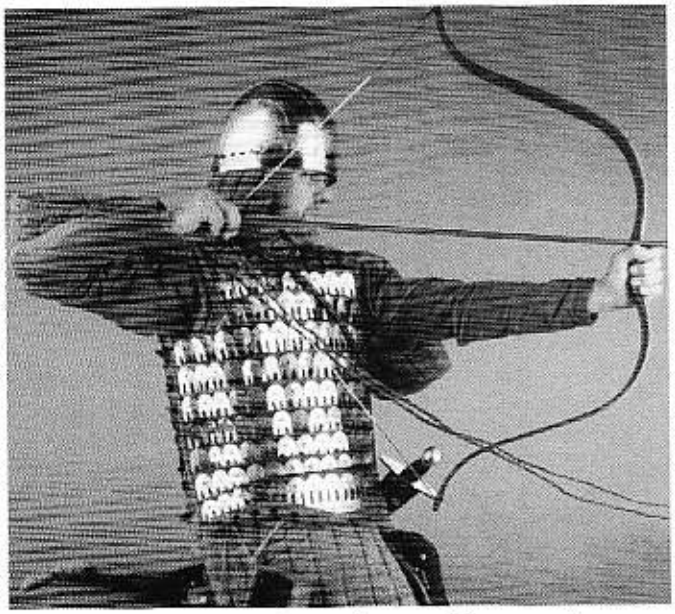

Fig. 13: Reconstruction of a tenth to twelfth-century horse archerincorporating a klivanion *of B2r lamellar.*

Type B3^{o}
St Orestes, Fresco, Church of the Dormition, Episkopi, early C13th.[26]

Type B2r^{o}
Goliath, Psalter of Basil II, St Mark's Library, *c.* 1017[27]
Joshua, Fresco, Church of Hosios Loukos, Daphne, C11th.[28]
Saint, fresco, Church of Saint Barbara, mid-late C11th.[29]
St Theodore Stratelaitēs, steatite icon, Museo Sacro 982, C11th.[30]
Saint, steatite icon, Princeton Uni Art Museum no. 5757, C12th.[31]

Type B2r
St Dēmētrios, Mosaic, Church of Hosios Loukos, Daphne, C11th.[32]
Sts George & Theodore, fresco, 'Serpent Church', Gšreme, Cappadocia, C11th.[33]
St Nestōr, fresco, Church of St Nickolas of Kaznitzi, late C12th.[34]

Type B2r2
Proximos Iōannēs, *Adrianople Gospels*, San Lazzaro cod.887. f. 8r; , 1007.[35]
Fresco, *Monastery of the IX century*, Cappadocia, C11th?[36]
'Hidden Church', Gšreme, Cappadocia, C11th.[37]

Type B4r^{o}
St George, steatite icon, Vatopedi monastery, Mt Athos, C11th.[38]
Saint, steatite icon, Veliko Turnovo Museum, C12th.[39]

Type B4r
3 Sts (2 lamellar). Steatite icon, Cherson Museum 84/36 445, C12th.[40]

The process that has been described here shows that archaeology and Byzantine art of the 10th to 12th centuries can be seen to illustrate a logical and functional sequence of technological innovation and refinement negotiated by economic factors. This process further undermines the image of middle Byzantium as technologically moribund, at least as far as military science is concerned.

NOTES

1 Vat. Pal. Gr. 431.
2 I acknowledge that I am not the first to venture into this area. One notes the article by Ada Brun de Hofmeyer (HOFMEYER, 1966). Unfortunately Hofmeyer's essay was very much undermined by her choice of source, for the Madrid Skylitzes is too detached from a Byzantine milieu, and in places too sketchily rendered, to support the attempt. See WILSON, 1978, 14209–19, and SHEVCHENKO, 1984, 117–130. On reconstruction armour from depictions: BISHOP, 1989, 697–705.
3 DAWSON, 1998.
4 Photographs of a reconstructed klibanion of B2r lamellar can be found in DAWSON, 2002, and at www.levantia.com.au.
5 I am pleased to note the contributions of Stephen Lowe and Peter Beatson to the refinement of my theories. They both drew my attention to additional source material and other scholarship in the area, and offered challenging opinions.
6 HALDON, 1990, 128 and elsewhere.
7 ROBINSON & EMBLETON, n.d., 26; HALDON, 1975, 13–15.
8 THORDEMAN, 1939, 246–7 gives an excellent collation of plate styles.
9 BOHEC, 1994, 52 and elsewhere on fabricae in legionary forts, and 120–3 on weapons and logistical supply more generally.
10 MacMULLEN, 1963, 26.
11 TREADGOLD, 1996, 176–86.
12 HALDON, 1993.
13 THORDEMAN, 1939, 246, no. 4.
14 CLARKE & AMBROSIANI, 1991, 75.
15 *Ibidem*, 167 for Byzantine trade to Scandinavia, 169 for Byzantine coins found at Birka; and specifically in lamellar, STJERNA, 2001, 40–1. A translation of the relevent portion by Ny Bjorn Gustafsson was kindly relayed to me by Peter Beatson with the translator's consent.
16 KALAVREZOU-MAXEINER, 1985, vol. 1, 116 and vol. 2, pl. 15.
17 These observations are based upon the results of experiments conducted upon reconstructed samples. For more on these tests see the BMGS article.
18 Bib. Marc. gr. Z 17, f. 4v- the oft reproduced picture of David and Goliath: EVANS & WIXOM, 1997, 188; HEATH, 1979, 8.
19 BRETT *et al.*, 1947, 99.
20 BEATSON, 1998, 3–8.
21 BEATSON, 1998, 7.
22 Adrianople Gospels, San Lazzaro cod. 887, f. 8r: EVANS & WIXOM, 1997, 357; also SPATHARAKIS, 1976, fig. 24–5.
23 Photos supplied by Stephen Lowe.
24 KALAVREZOU-MEXEINER, 1985, no. 25.
25 EVANS & WIXOM, 1997, 51.
26 EVANS & WIXOM, 1997, 188.
27 NICOLLE, 1996, cover.
28 RODLEY, 1993, fig. 178.
29 EVANS & WIXOM, 1997, 158.
30 KALAVREZOU-MEXEINER, 1985, no. 26.
31 SHERRARD, 1966, cover.
32 Photos supplied by Stephen Lowe.
33 ISTORIA, 1980, Volume Q, 406.
34 EVANS & WIXOM, 1997, 357.
35 Photos supplied by Stephen Lowe.
36 Photos supplied by Stephen Lowe.
37 SHERRARD, 1996, 54.
38 KALAVREZOU-MEXEINER, 1985, no. 24a.
39 BANK, 1978, 147.

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