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THE MEDIEVAL CROSSBOW AS
SURGICAL INSTRUMENT:
AN ILLUSTRATED CASE HISTORY*

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FROM prehistoric into modern times, physicians have had to cope with arrow wounds. The wars which ceaselessly punctuated man's progress ensured a stream of victims, to which hunting accidents added their share. Not long ago arrow wounds bedeviled American army surgeons during Indian wars,¹ and fighting in Vietnam has turned up a few cases. Treatment has varied according to the surprising variety of projectiles involved, the medieval crossbow offering a particular problem. Ranked as a kind of lesser artillery and manned often by elite corps, the ancient crossbow became a dominant weapon on 13th century battlefields, as technical advances improved its range and loading. The crossbow could be carried loaded, required little training or strength, and propelled its quarrel or bolt with frightening accuracy and force for eighty yards on direct aim and double or triple that on extreme range. Its metal bullet,

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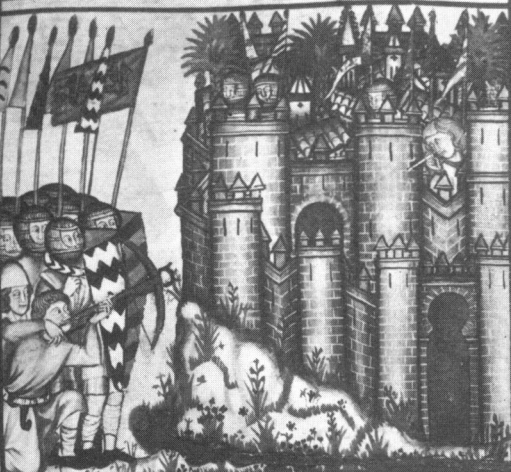
feathered with wood or leather and bearing one of several types of head, could penetrate deeply. Richard the Lion Heart popularized it in England as his favorite weapon, and died by it.²

The ecumenical council of Lateran II in 1139 and several popes, including the great Innocent III, expressed the general horror at the crossbow's bloody efficiency by forbidding it in Christian warfare under pain of excommunication; they allowed it only for the defense of Christendom against external enemies. The prohibition, ineffective like so many attempts at arms control, underlines the special problems the crossbow introduced to military medicine. Later in the century, at the French siege of Gerona, a crossbow sharpshooter called his shot and then fired from the town walls into the narrow window of a suburban church being used as a hospital, his bolt piercing both a wounded knight and his esquire.³

The medical problem posed by crossbows, both in higher incidence of wounds and deep penetration, was most acute on the Christian-Moslem frontier of Spain. In Spanish Islam, according to a treatise on military archery by Taybughā in 1368, "crossbows are a great favorite and are the weapons of preference."⁴ This had certainly been true a century earlier, when battles often revolved around a fortification. At that time, as the Almohad empire fragmented in Western Islam, Spanish crusaders had surged down the lower half of their peninsula. On the east coast, ranks of Muslim crossbowmen defended town walls, while bodies of Christian crossbowmen from such renowned centers of crossbow archery as Tortosa matched them shot for shot. King James the Conqueror, who led Aragon's armies, nearly succumbed under the walls of Valencia as a bolt caught him across the forehead; blinded with a feshet of blood, he managed to hold his saddle and conceal the seriousness of his wound from the army, but his head soon swelled, and his skull, extant, carries along its front an impressive crease.⁵

King James's contemporary, Alfonso the Learned of Castile, has left his own testimony to the terrible crossbow, in a picture story about the siege of Elche, south of Valencia. Alfonso supervised the construction of a masterpiece as great as those of his contemporaries Aquinas, Dante, and the architects of Gothic cathedrals—though it is by its nature seldom seen. The *Cántigas* or "Songs in Praise of St. Mary" interweave a corpus of 1,262 miniatures with a matching corpus of troubadour poetry, all set to music.⁶ Centering upon miracle legends of Our Lady, the themes

Comounto d'una eide e ferio un eichão d'ua sacra no vsto.



E. li quiseo aitar a sacra do vsto co reias e non podon . 1 .



Como lla quiseon aitar con hua bueta e non podon .



E. se fez leuar aa eglise de santa maria quell ouuesse mce.



Como se manifestou e se repeniu muito de seus pecados.



Comolle trouo santa maria a sacra e por en sua lauda sepe amz.



inevitably touch upon some medical problems. The almost anachronistically realistic style of the paintings heighten their value for historical study. The Elche episode shown in our illustration probably belongs to the definitive conquest of Murcia kingdom, tributary to Castile, by the combined forces of Kings James and Alfonso in 1266. The panels read like a comic strip, from left to right, down the page. The first picture shows a Muslim crossbowman hitting a citizen or possibly a commoner knight—any townsman who could maintain horse and equipment at his own expense. The bolt has taken him frontally in the neck, just below the right ear; short and heavy, it would have looked either triangular or square if seen in cross-section, with its tip an equilateral triangle when viewed from the side. Note the crossbow in the picture, the osmosis of military fashion in both armies, and the distinctive palms of Elche.⁷

In the second panel a body of surgeons attends the gentleman in his affluent home surroundings. Apprehension marks his face, as the senior surgeon applies forceps to draw the bolt. Perhaps lodged in bone, the bolt resists all efforts, but bleeding results. By panel three the medical men are resorting to a final expedient. The patient's head is bound, probably to staunch the bleeding; his disarrayed clothing suggests the ordeal he has been through; his countenance, swollen by now, betrays deep suffering; and he is clinging to a pillar of his house. A crossbow has been attached to another pillar, its cord connected with the bolt, seemingly by a forceps arrangement. Two physicians hold the patient's head in position, one supplying absorbent bandages under the wound. Obviously they plan to fire the embedded projectile in reverse, dislodging it by main force. Panel four shows the poor fellow, now much the worse for wear but firmly attached to his bolt, his case abandoned as hopeless, making his doctors help him to a nearby Marian shrine. The final panels portray his prayerful confession and his cure, while asleep, at the hands of the Virgin and her two attendant angels.

Until heavenly forces intruded, the patient had proved unlucky. Yet in terms of medical expertise, he lived in a fortunate country. Jewish, Christian, and Moslem physicians abounded; Aragon was soon to introduce legislation for examining and licensing doctors from all three communities. Montpellier, the birthplace of King James and home of his university, boasted the best medical faculty in Europe. One of the greatest physicians of Europe, the Valencian Arnold of Villanova, graced this area during the second half of the 13th century. During the siege of

Valencia, King James tells us in his memoirs, so many drugs from Montpellier and Lérída were on sale that the sick might think themselves in a large city. King Alfonso of Castile, patron of Islamic learning, also gave attention to medical education in his closet-code of ideal law, the *Siete partidas*. Thus the Elche victim could not have lacked competent diagnosis and care.⁸

The extractive methods employed in our illustration can be better understood when placed in the context of contemporary surgical practice, as revealed in a medical treatise such as Henri de Mondeville's *Surgery*. Compiled some 50 years later, it reflects the experience of the previous years. De Mondeville was physician to Philip the Fair of France. He cites ancient and modern authorities, including Villanova, and ranks himself with "the modern surgeons."

Like all university products of his day, he takes pride in his bookish background, dealing in syllogisms and erudition as handily as in experience. The first part of his second treatise in *Surgery* deals with foreign bodies embedded in the patient, with particular attention to arrows and crossbow bolts. He cautions against the traditional wisdom, which counsels leaving the object either because one fears hemorrhage or hopes for a facilitating suppuration or a rejection by the body; the "modern" physician has a range of instruments and techniques to ensure staunching of blood flux and to extricate any object.⁹

He knows that eventual lubrication cannot compensate for the damage bound to result from leaving the object, and that vital forces will decline before nature can reject it. He knows too that a few fortunates have been able to carry foreign objects for life, but he wryly reminds us that the majority with this problem are invisibly underground. The physician must not only counter such folk medicine, but must be resigned to gain little credit from these cases; if he does not operate, the friends of the dead victim cry negligence; if he does operate, his experimentation has caused death; if he succeeds, the layman credits nature and God, since the physician has merely removed an obstacle to health. Avicenna and others speak of magnets and "attractive medicines," but De Mondeville believes these merely masked a suppurative process in lightly embedded objects; and he suspects malpractice in some such cases, complicating a simple operation to win an easy reputation.

General rules in the case of arrows, he tells us, are three. First, one must choose or invent mechanisms most appropriate to the job at hand.

Not only are there many kinds of arrows, but military ingenuity is constantly challenging the surgeon with new species. What works in one case can wreak disaster in another, as when he himself diagnosed a wound to have been caused by a nonbarbed arrow. The position of the arrow, its degree of visibility, its composition in wood or metal, its size, the possibility of poison on it, the advisability of enlarging the wound, the location of the wound, and the complications of dirt and pebbles carried into it, all enter into the diagnosis. Above all, the physician must not simply wrench the thing out by force without such examination, nor allow his less experienced assistants to attempt this while he is on his way. The second rule is to extract as delicately and swiftly as possible, and the third is to staunch the flow of blood. As to particulars, he describes a half-dozen "engines of extraction"; and he gives practical instructions, such as to grasp the arrow as close to the body as feasible. If the patient is unlikely to survive, the physician should allow him time to prepare for death before precipitating the crisis; while priest and family rally around, the physician can be laying out his instruments, shaving the skin, and making similar preparations.

De Mondeville adverts to the bizarre method used in our Elche case. In explaining available mechanisms, he puts it last and briefly: "The crossbow is well known [and] is useful on occasion." Later, when dealing with the category of arrows visible externally, he lists the crossbow as an instrument of last resort, when all other expedients have proved ineffective. "I have never seen that means fail," he avers, "except once."¹⁰ The Elche pictures, therefore, must illustrate a common medical practice, in its orthodox deployment, on a case far more stubborn than the normal. They illustrate as well a paradox which repeats itself in the intertwined history of warfare and medicine. The weapon which seems the ultimate horror of war can be turned to healing—in this instance to the healing of the damage it itself inflicted.

NOTES AND REFERENCES

1. Arrow wounds carried a higher death rate than those caused by any other weapon around 1860. See the medico-military reports cited in Burns, R. L.: *The Jesuits and the Indian Wars of the Northwest*. New Haven, Yale University Press, 1966, p. 226.
2. On the crossbow, see Patrick, J. M.: *Artillery and Warfare During the Thirteenth and Fourteenth Centuries*. Logan, Utah, Utah State University Press, 1961.
3. Desclot, B.: *Crònica*, Alentorn, M. C., editor, 4 vols. Barcelona, Editorial Barcino, 1949-1950, chap. 91.
4. Taybugha, al-Baklamishī 'l-Yūnānī: *Saracen Archery*, Latham, J. D. and Paterson, W. F., editors. London, Hol-

- land, 1970, p. 9. On varieties of crossbow and Spanish preference for laqshah rather than the Frankish *jarkh*, see pp. 8, 9.
5. James I: *Crònica*, de Casacuberta, J., editor, 9 vols. in 2. Barcelona, Editorial Barcino, 1926-1962, chap. 266. Full background on Spain and this crusade is in Burns, R. I.: *The Crusader Kingdom of Valencia, Reconstruction on a Thirteenth-Century Frontier*, 2 vols. Cambridge, Mass., Harvard University Press, 1967; also in Burns, R. I.: *Islam under the Crusaders, Colonial Survival in Thirteenth-Century Valencia*. Princeton, N. J., Princeton University Press. In press.
 6. In the manuscript collections of the Escorial Library, reprinted from Burns, R. I.: Christian-Islamic confrontation in the West: The thirteenth-century dream of conversion. *Amer. Hist. Rev.* 76:1,386-1,434, 1971, where a portfolio of companion episodes is also given, together with full information and bibliography on the *Cántigas*.
 7. *Saracen Archery*,⁴ pp. 29-30, 176 on bolts. On the commoner knight, see Lourie, E.: A society organized for war: Medieval Spain. *Past Pres.* 25: 54-76, 1966. On the Murcian war, see Fontes, J. T.: *La reconquista de Murcia en 1226 por Jaime I de Aragón*. Murcia, Diputación, 1967.
 8. For background see Burns, R. I.: Los hospitales del reino de Valencia en el siglo XIII. *Ann. Estud. Mediev.* 2:135-54, 1965; also Burns, R. I.: *Crusader Valencia*,⁵ vol. 1, chaps. 13, 15. For King James, see his *Crònica*,⁵ chap. 265.
 9. *Chirurgie de Maître Henri de Mondreville, chirurgien de Philippe le Bel, roi de France*, composée de 1306 à 1320, Nicaise, E., translator. Paris, Alcan, 1893, treatise II, *doctrina* I, chap. 1. See also Gurlt, E.: *Geschichte der Chirurgie und ihrer Ausübung*, 3 vols. Hildesheim, Olms [1898], 1964, II, 34-77, esp. p. 47; and Garrison, F. H.: *Notes on the History of Military Medicine*. Hildesheim, Olms, 1970, p. 81.
 10. *Chirurgie de Maître Henri de Mondreville, chirurgien de Philippe le Bel, roi de France*,⁶ pp. 235, 237; "nunquam in extractione vidi modum istum deficere nisi semel."