Polo himself. Yet I have not introduced the words just quoted into our text, because they are, as we shall see presently, notoriously contrary to fact.

NOTE 2.—The same MS. has here a passage which I am unable to understand. After the words "300 lbs. and more," it goes on: "Et la veoit l'en voler moult loing, desquelles pierres *il en y avoit plus de* lx *routes qui tant montoit l'une comme l'autre.*" The Bern has the same. [Perhaps we might read lx *en routes*, viz. on their way.—H. C.]

NOTE 3.—I propose here to enter into some detailed explanation regarding the military engines that were in use in the Middle Ages.* None of these depended for their motive force on *torsion* like the chief engines used in classic times. However numerous the names applied to them, with reference to minor variations in construction or differences in power, they may all be reduced to two classes, viz. *great slings* and *great crossbows*. And this is equally true of all the three great branches of mediæval civilisation—European, Saracenic, and Chinese. To the first class belonged the *Trebuchet* and *Mangonel;* to the second, the *Winch-Arblast* (Arbalête à Tour), *Springold*, etc.

Whatever the ancient *Balista* may have been, the word in mediæval Latin seems always to mean some kind of crossbow. The heavier crossbows were wound up by various aids, such as winches, ratchets, etc. They discharged stone shot, leaden bullets, and short, square-shafted arrows called *quarrels*, and these with such force we are told as to pierce a six-inch post (?). But they were worked so slowly in the field that they were no match for the long-bow, which shot five or six times to their once. The great machines of this kind were made of wood, of steel, and very frequently of horn;† and the bow was sometimes more than 30 feet in length. Dufour calculates that such a machine could shoot an arrow of half a kilogram in weight to a distance of about 860 yards.

The *Trebuchet* consisted of a long tapering shaft or beam, pivoted at a short distance from the butt end on a pair of strong pyramidal trestles. At the other end of the shaft a sling was applied, one cord of which was firmly attached by a ring, whilst the other hung in a loop over an iron hook which formed the extremity of the shaft. The power employed to discharge the sling was either the strength of a number of men, applied to ropes which were attached to the short end of the shaft or lever, or the weight of a heavy counterpoise hung from the same, and suddenly released.

Supposing the latter force to be employed, the long end of the shaft was drawn down by a windlass; the sling was laid forward in a wooden trough provided for it, and charged with the shot. The counterpoise was, of course, now aloft, and was so maintained by a detent provided with a trigger. On pulling this, the counterpoise falls and the shaft flies upwards drawing the sling. When a certain point is reached the loop end of the sling releases itself from the hook, and the sling flies abroad

* In this note I am particularly indebted to the researches of the Emperor Napoleon III. on this subject. (*Etudes sur le passé et l'avenir de l'Artillerie;* 1851.)

† Thus Joinville mentions the journey of Jehan li Ermin, the king's artillerist, from Acre to Damascus, *pour acheter cornes et glus pour faire arbalestres*—to buy horns and glue to make crossbows withal (p. 134).

In the final defence of Acre (1291) we hear of balistae *bipedales* (with a forked rest?) and other *vertiginales* (traversing on a pivot?) that shot 3 quarrels at once, and with such force as to *stitch* the Saracens to their bucklers—*cum clypeis consutos interfecerunt.*

The crossbow, though apparently indigenous among various tribes of Indo-China, seems to have been a new introduction in European warfare in the 12th century. William of Brittany in a poem called the *Philippis*, speaking of the early days of Philip Augustus, says:—

"Francigenis nostris illis ignota diebus
Res erat omnino quid balistarius arcus,
Quid balista foret, nec habebat in agmine toto
Rex quenquam sciret armis qui talibus uti."
—*Duchesne, Hist. Franc. Script.*, V. 115.

Anna Comnena calls it Τζάγρα (which looks like Persian *charkh*), "a barbaric bow, totally unknown to the Greeks"; and she gives a very lengthy description of it, ending: "Such then are the facts about the *Tzagra*, and a truly diabolical affair it is." (*Alex.* X.—Paris ed. p. 291.)