

The Royal United Service Institution.

The following notice of this Institution is taken from *Iron*, it is well worth perusal.

Founded in 1831, under the auspices of the King and the patronage of the Duke of Wellington, the Royal United Service Institution addresses itself to the promotion of Naval and Military art, science, and literature. Lectures are delivered on questions of deep moment to the Military world, a large library has been collected, a journal published and a museum established containing Naval and Military models, a collection of the arms of all nations, and many objects of great historical value. Admirably located, the museum of the institution is ever ready as a book of reference wherein those led to the study of Naval and Military science may find examples of every development of warlike engines. Systems of defence, from the days of Vauban down to the age of earthworks, are depicted in a series of admirable models, executed by professional hands with wondrous care and patience. From the early days when the Turks showed how heavy artillery could be brought to bear on fortified places by the use of trenches, the art of attack gradually overcame the art of defence, until under Vauban, siege operations against the best fortified city in the world became merely a matter of time, and the reduction of the stronghold, however skilfully constructed, depended simply upon a sufficient force to invest it completely, and advance by regular parallels until the fire of a large circle concentrated upon a smaller one rendered the fortalice untenable. To so great a pitch of exactness was this science carried that at one time it could be calculated to a nicety—barring the presence of kings, royal dukes, and other disturbing influences—how long it would take a given army to reduce a given fortress. Even with the feeble artillery anciently in use, stone revetments were found unavailing, and the slow but sure advance of the trenches, which, flattened in their inception, assumed bolder curves towards the last, brought certain destruction to the doomed city. For more than a century European armies indulged in campaigns made up mainly of sieges, and the attack and relief of fortified places made up the history of warfare; but at last the genius of Napoleon discovered that armies might dare to neglect a fortified well garrisoned town in their rear, and could devastate a country, win battles, and sign treaties without heeding the possible power of a few thousand men cooped and cramped in the limits of a walled town. In our own day experience has taught that earthworks and heavy guns inside are apt to prove a match for enemies outside, and the sieges of Silistria, Kars, and Paris show that once more the arts of defence have stolen a march upon those of attack. To students in fortification the United Service Museum affords instructive models—infinitely more agreeable to study than the dry diagrams from which a knowledge of fortification is so often derived.

Perhaps no such interesting record of weapons could be found elsewhere. Here are the primitive stone arms employed in the youth of the human race—flint axo heads, daggers and arrow heads, chipped by a long and laborious operation into a practicable shape. Near these curious relics of ancient Europe are specimens of the stone weapons still in use in remote corners of the earth. A magnificent jade stone axo from New Zealand throws European examples into the shade, but is, like all these weapons, unprovided with an aperture for the

handle. In fact, these stone axo heads were and are still simply tied on the shaft with stripes of hide or bands of woven grass. A collection of savage weapons would be very incomplete without boomerangs and assegais, and the curious kind of sling used in propelling the latter weapons. Here, also, is a good store of bows and arrows of every imaginable shape and size. An exceedingly venerable long bow and sheaf of arrows are said to have belonged to a Crusader, and were found at Aleppo, in a guard house, which had been built over and forgotten for many centuries. Less interesting to Englishmen, but yet worthy of note, is the steel hunting bow of Tippoo Sultan—a powerful instrument, but inferior to the tremendous crossbows or arblasts which immediately preceded the introduction of villainous saltpetre—and for a long while held their own against primitive musketry. The best arblasts are composed of a steel bow of great stiffness, fitted on to a heavy stock, and supplied with powerful winding machinery. According to Jouville, and other writers of the crusading period, larger arblasts were used as wall pieces, for hurling bolts tipped with fire at the extraordinary wooden structures under cover of which the besiegers of the middle ages advanced to the attack. Great precautions were taken against these fiery missiles. The wooden edifices which crowned the Gothic tower, making it when finished like in outline to the pepper box tower of a later period—a detail generally omitted by modern artists—was covered, if possible, with hides, and the great moving towers and lofty screen of the besiegers were protected in similar fashion. These safeguards were often set at naught by the artillerymen of the period, who, according to Jouville, infested the attacking army with a pitching fire, shooting their fiery bolts up in the air so that they should pass over the protecting screen and carry disorder among the besiegers ranged behind.

The invention of gunpowder gave a new direction to human ingenuity. Curiously enough, the best specimen of a primitive cannon, like the one which might have been used at Crecy, comes from Canada. Made of hard wood, bound by iron hoops, this weapon was not encrusted with round shot or shell, but was loaded with bullets, pebbles, chunks of iron, tennenny nails, and anything else which happened to be handy. Between this primitive engine and the cannon of the Tudor period there is a great gulf. Modern readers unacquainted with the history of gunnery will be interested to hear that the guns of the fifteenth and sixteenth centuries were breechloaders. In the United Service Museum are many proofs of this curious fact. Cannon from the wreck of the *Mary Rose*, sunk in action off S. Ithead, some very peculiar Dutch guns of early date, and the spare chambers of cannon of the reign of Henry VI., found at Dover, amply demonstrate the antiquity of the breechloading system. The hinder part of the gun formed a kind of trough, into which was fitted a heavy mass of iron containing the charge. This was fixed in tightly with a wooden wedge, and the gun was fired. No doubt while gunpowder was a comparatively weak and imperfect explosive this plan answered very well. The escape of gases at the wrong end of the gun—although objectionable to the cannoniers—was not very serious; but as the manufacture of gunpowder improved, the old breechloaders fell into disrepute, and were universally replaced by muzzleloaders. Strangely enough, the latter form of gun underwent a revivification only a few years ago, and at the great Exhibition of 1862 the Armstrong gun was the observed

of all observers, albeit many philosophers marvelled greatly at the appearance of a warlike engine in an exhibition for promoting peace and brotherhood among men. Nevertheless, the exhibitors were right and the philosophers wrong, for since the period referred to mankind have exhibited an unusually strong tendency to rely upon "the holy text of pike and gun," and to refer all controversy to "infallible artillery."

For a few years breechloaders had it all their own way, and many monuments of the ingenuity employed in their construction may be found in Whitehall Yard. The wind, however, has changed, and a reaction set in in favour of muzzle loading cannons. Here are models of the great guns of these latter days—a steel 6 pounder Krupp split in two to show the grain of the metal—a model of the great Mallet mortar, constructed to throw a 36 inch shell—models of the great 41 ton gun of Bhurtpore, with its tiger mouth and grinning fangs—beautifully finished models on the Moncrieff counterpoise and hydraulic systems—of the curiously shaped Whitworth gun and bolt—of the Horsfall, Blakely, Perrot, and Rodman guns. Last, but not least, come the 31 ton gun, and the greatest development of all, the monster 11 ton gun now in process of construction, to throw a shot weighing 1,700 lb. All the models of guns are very properly constructed on the quarter scale, so that not only the shape but the comparative size of new ordnance is clearly shown.

In due proportion to the enormous shot to be propelled are the grains of powder. Pebble powder of the size of a haincot bean was once supposed to be fit for guns of the largest calibre, but the pebbles shrink into insignificance by the side of the 2 inch cubes which represent the gunpowder of the future. Among the greater ordnance, block gunpowder and chilled shot, common shell and shrapnel—war rockets make an insignificant figure, but are nevertheless of immense value in the "little wars" with savage tribes, as by quick manoeuvring the dreaded missiles may be made to appear as if coming from several different points, to the infinite consternation and confusion of uncivilized adversaries.

It is interesting to note, side by side with the evidences of the ebb and flow of taste in breechloading or muzzleloading ordnance, that a not exactly similar but still not unlike mutation has taken place in hand firearms. Matchlocks—many of them highly ornamented—were well represented, as were also the wheel locks, which were brought at last to a high degree of perfection. The great objection to the wheel locks, was that it required winding up between every discharge to give the small steel wheel the necessary power of revolution in contact with a piece of pyrites, and to thus elicit the necessary spark. More interesting is the snaphaunce, the immediate precursor of the flint lock, which held its own for so long a period. A snaphaunce pistol of the date of Charles the First is remarkable for another reason than its peculiar lock. Fitted with a single brass barrel, this curious pistol has a revolving chamber containing six charges, and differs but slightly from a Smith and Wesson—with all the modern improvements—now in my possession. It is therefore clear that the revolver principle is at least as old as the flint lock. This snaphaunce pistol is certainly the earliest revolver which has come under my notice, but there is, I believe, one of later date in the Tower, and the Indian Museum has a match lock revolver made in Central India at least a hundred years ago. There is not much to wonder at