position gun; 9, 6 and 3-pounders were associated with the trap howitzer, before enumerated in our field batteries, but since the introduction of our rifled field ordnance they are only found in our batteries in India, and the depots of instruction at home. Of wrought iron smooth bore we have two kinds—the 150-pounder of 240 cwt., and the 100-pounder of 125 cwt. These are made on the built-up plan, and are intended for our naval service, and will be provided with steel shell and Palliser chilled projectiles, for firing against iron-clads.

Rifled ordnance may be looked upon as modern artillery, "par excellence." Very great irregularities occur in the paths of projectiles fired from smooth-bored guns; in fact, if the same gun is fired several times with a like weight projectile, and the same quantity and quality of powder, there will still be a great difference in the distance these shots range—some of them falling to the right and some to the left of the object aimed at. In consequence of this much trouble and expense has been incurred to trace the cause of the inaccuracies, and to find a remedy for them. Three reasons exist for these: 1st, windage: 2nd, eccentricity of figure of projectile: 3rd, imperfection of figure and roughness or unevenness of surface. That is to say, in order to enable us to load a smooth-bored gun, we are obliged to allow a certain difference between the diameter of our projectile and that of the bore of our gun, in consequence of which a space intervenes between the top of the shot, when home, and top of the bore. The gas from our powder partly escapes through this, and is wasted, consequently acts with less power on the shot, and its range is diminished accordingly. Again the shot is loose in the bore, and the powder acting on its upper part drives it against the bottom of the bore, causing it to rebound and strike the top again some way down, and so on until it leaves it in an accidental direction with a rotary motion and depending chiefly on last impact. Again, all shot, owing to the want of uniformity in casting, are more or less eccentric, consequently one-half is heavier than the other, and the shot incline towards the heavier one; also, they are never quite round, their surfaces rough, which causes them to strike the air unevenly, and deviate from their true path. It has then been ascertained that by giving a projectile, a rotatory motion around its longer axis sufficiently sharp to overcome these accidental ones, the accuracy required will be obtained, and this is the object of rifling guns. Now three methods have been adopted to get this rotatory motion.

1st, by mechanical means inside the bore; 2nd, by the action of the gas of the powder on the shot in the bore; 3rd, by the pressure of the air on the projectile after it has left the bore. The 2nd and 3rd plans have not given any very satisfactory results; the rotatory motion is here obtained by having wings or spiral groves on the projectile. The 1st plan consists in cutting spiral groves down the bore of our guns, varying in number, depth and turn, according to the system they belong to, into this one projectile, is either forced, or by having buttons or studs on, it slides along these, and thus issues from the bore rotating more or less sharply around an axis coincident with the line of fire. The introduction of rifled guns was immediately followed by that of elongated projectiles, which have many advantages. The exact form of projectile cannot be said to have been decided upon: but the cylindro conoidel, or cylindrical with comcal head is the one that has been mostly adopted, modified to suit the particular system of rifling for which it is intended. The base is usually flat, but propositions have been made to taper it off, under the idea that such form would increase its range. The "ogival pointed" ones, I think, are those which are best suited for firing against armour plate.

Let us glance at the different systems of rifling that have been brought forward: these are comprehended under the following four classes:

1st — Muzzle loading or breech-loading guns, with projectile filling the peculiar form of bore; 2nd—Musket-loading gun, with projectiles with soft metal studs or ribs to fit the groves; 3rd—Musket-loading gun, with projectiles having soft metal coating or envelope, which is expanded by the gas in the bore; 4th—Breech-loading gun, with projectiles having soft metal coatings larger than bore. Of the first class the one most familiar to us is Whitworth's hexagonal bore, with its projectile tunnel to fit it. The French Shunt gun belongs to the 2nd class, as do our heavier muzzle-loaders. Bashly Britten's system is an instance of the 3rd class. This gun has five shallow grooves, and the projectile is expanding, being made of iron, but having a lead envolope and a wooden sabot. The shells loads easily, being less in diameter than the bore; but when the gun is fired the gas drives the sabot against the envelope, and expands the lead into the grooves, so that the shot acquires a rotatory motion. To the fourth-class belong our breech loading poly grooves, the original Armstrong guns, these have their projectiles covered, except the nose, with lead and antimony, their diameters being slightly larger than the bore of the gun, from which they are fired, and are forced through the grooves by the charge of powder. We have then in the Royal Artillery two different classes of rifled guns and five varieties of rifling Of the fourth-class we have the following calibres with breech-screws, 7-inch 40-pounder, 20-pounder, 12-pounder, 9-pounder, 6 pounder, and 64-pounder and 50-pounder on the wedge principle. All our muzzle-loaders are of the 2nd class: of these we have: 1st—A 64-pounder of 64 cwt. rifled, on the shunt principle, then a 13-inch or 600-pounder, 23 ton, also on the shunt principle; a 9-inch, 12 tons, on the Whitworth increase, 6 grooves, 1.10-inch to 45 calibre: 8-inch, 9 tons, on the Woolwich uniform and Whitworth increase; 7-inch, 7 tons Woolwich uniform, 3 grooves, 1-inch 35; 7-inch, 6.5 ton Woolwich uniform, 3 grooves, 1-inch 35.

The charges for rifled ordnance are much less than those of smooth-bores, carrying projectiles of equal weight. It must, however, be remembered that the smaller charge has a greater proportional effect, for rifled guns have little or no windage, and there is, therefore, hardly any escape of gas; besides, greater force being required to compress a projectile into the grooves, time is most probably allowed for the conversion of the whole of the charge into gas, before motion is communicated to the projectiles; the powder for rifled ordnance ought to be of a more gradual and slower nature, in order to allow the projectile time to take the rifling during its passage through the bore, a too impulsive, or the same powder as used for smooth-bores, would cause it to strip and pass out of the bore rotating uncertainly Gun cotton is for that reason not applicable to rifled ordnance.

[TO BE CONTINUED.]

THE QUEEN'S BIRTHDAY IN KINGSTON.

A correspondent sends us the following report of the proceedings in the "old capital," clipped from the 'Whig':—

"The natal day of Her Gracious Majesty Queen Victoria was celebrated on Friday in a becoming manner in Kingston. The obstinate rain greatly marred the success of the military display, for it rained at intervals from early morning until the afternoon, when the weather cleared up and became fine. But taken altogether a deal of spirit was shewn in the celebration, which, under the circumstances, was creditable to the city. The Royal Standard was hoisted at Fort Henry, at Fort Frederick, and on one of the flag staffs at the City Hall. The gunboat 'Heron,' lying at the Dockyard, was decked with flags from hull to musts; bunting was crowded on in every available space. Jack Tar is never behind his neighbors in making a bold display of his loyalty and respect for his Sovereign. The gunboat had a more than gay appearance. The Volunteers of the 14th Battalion mustered in good numbers at the drill shed at half-past nine o'clock, and were regularly inspected by Lt.-Col. Jarvis, Assistant Adjutant-General of Militia, previous to marching to the parade ground Col. Jarvis expressed himself pleased with the attendance, dress and appearance of the Volunteers. The Portsmouth Company of Infantry also marched to the shed, and were inspected. The Kingston Cadet Corps, composed of the pupils attending the Kingston Grammar School, were also present, and attracted the major share of attention. The cavalry and artillery mustered elsewhere, and, with the other Volunteers and regulars in garrison, reached the Barriefield Commons about half-past eleven o'clock, to take part in the review. The whole force was drawn up in line at a quarter to twelve o'clock, the Kingston Troop of Cavalry, Capt. Duff, on the extreme right, supported in turn by Capt. Drummond's Volunteer Field Battery of Artillery, the Kingston Cadets, the two Garrison Batteries of Artillery from Fort Henry, the Royal Canadian Rifle Regiment, the 14th Volunteer Rifles, and on the extreme left, by the Portsmouth (Capt. Craig's) and Wolfe Island Companies of Volunteer Infantry,—a portion of the 47th Frontenac Battalion. The R. C. Rifles were commanded by Lt.-Col. Moffatt, the 14th Battalion by Lt.-Col. Paton, and the Infantry of the 47th Battalion by Lieut.-Col. Hamilton. Col. Gibbon, R. A., had command of the field, and was accompanied by Lt.-Col. Shaw, Brigade-Major, Lt.-Col. Jarvis, and the Acting Town Major. While the battalions were forming rain fell quite heavily, but none of the spectators left the ground, though a very large number were present. Had the day been fine, however, the number would have been greatly increased, as the review was a grand feature of the day. At noon precisely, a salute of 21 guns was fired by the Royal Artillery from Fort Henry Hill, and succeeding it the Volunteer Field Battery on the Commons gave a similar salute at intervals with the "feu de joie" of the infantry. Three rousing cheers and a hearty tiger were given for Her Majesty by the troops, and the line marched past in slow time. The band of the B. C. Rifles and 14th Battalion were posted opposite the saluting base, and played alternately the slow and quick marches. The marching past in slow time was well performed, notwithstanding the pelting rain, which again began to fall, and the quick march was equally as pleasing a movement. The sham fight now commenced, and was continued without interruption from the rain, which now ceased."