



The rival rifling systems to impart spin to muzzle-loading projectiles. Above: The Armstrong. Top: The Whitworth.

It so happened that a suitable design was ready to hand. In 1863 another British manufacturer, Joseph Whitworth, had offered a new system of rifling in which, again, the bore was actually smooth but was hexagonal and with a twist in it. The projectile was likewise hexagonal, the sides being angled so as to match the angle of twist. He objected to the Armstrong monopoly of providing British guns and demanded a comparative trial; a Whitworth muzzle-loader, an Armstrong breech-loader and an Armstrong muzzle-loader were selected for competition, and the Armstrong muzzle-loading system was adjudged best. The Armstrong muzzle-loader used three deep grooves in the barrel and three rows of soft metal studs on the shell; the studs were introduced into the grooves as the shell was entered into the muzzle, rode down as the shell was rammed, and then rode up the grooves again, spinning the shell as it was fired. It was simple and reliable, whereas Whitworth's system, like the similar Lancaster, jammed its shot too often for comfort. And so the Armstrong breech-loading gun was quietly retired, and the RML (rifled muzzle-loader) came in its place.