dier is allowed to march "At Ease" and to bend his knees.

Therefore. if the constrained attitude of marching at "Attention," keeping the knees straight, as ordered in the "Position in Marching" (Sec. 11), is properly carried but, the muscles of the soldier's leg, besides being developed, are constantly being exercised in instinctive obedience.

A similar analysis of the motions of the muscles of the feet and arms, or, in other words, of the motions of turning and of handling the rifle, will convince every non-commissioned officer and private soldier why it is absolutely necessary that the greatest possible exactness and smartness must be insisted on in the performance of these motions, regarded as exercises in instinctive instantaneous obedience of the muscles to an order received by the brain and thence passed on to the muscles.

Every soldier must further understand that the reason of this strict discipline on the parade-ground, this instruction in the habit of instantaneous instinctive obedience to the word of command, is, not merely that the close-order drill may present a smart appearance, but that its object is to carry him victoriously through the utmost stress of modern battle; and that by this means only can he hope to fight successfully in that most difficult position of all, as part of a new unit hastily formed under a strange leader out of that mixture of old units which constitutes the pell-mell of a modern battle-field. In such a pell-mell his salvation will depend upon his discipline, upon his habit of instinctive obedience. That he may emerge victorious from such a desperate struggle, this is the object of his close-order drill on the parade ground.

Failure of a Large Armor Plate.

An armor test of a Carnegie nickel-steel Harveyized plate, seventeen inches thick, took place at the Indian Head proving grounds on the Potomac near Washington, July 12, and like the eighteen inch Bethlehem plate tested May 19, ended in the failure of the plate. The same gun—the inch rifle—was used in both cases. The plate was secured to a 44 inch oak backing, heavily braced. The distance of the gun from the target represented a range of about 1,200 yards. The Carpenter projectile weighed 800 pounds and was propelled by 260 pounds of brown prismatic powder; the muzzle velocity was 1410 feet per second. The first projectile fired penetrated 13½ inches and then bounded back 50 feet. In the second Wheeler Sterling shot the velocity was increased to 1 858 feet per second and the striking energy was advanced to 20,370 foot tons. The havoc wrought was terrible; the shot crashed through the plate and backing, deflected up, and landed 300 feet away. The head of the shot was somewhat injured, but the body of it was intact. The result was a great surprise to all concerned, especially to the makers, who had used all possible care in its fabrication the plate being left in the Harvey furnace for twenty-eight days. Upon this test depended the acceptance of 287 tons of armor for the battleship Oregon, worth $246,000. The loss to the company for the plate, even if the armor if finally accepted, will be $20,000.

The Secretary of the Navy ordered another test the next day, using the same shells as were used in the June test of a Bethehem plate. The Carpenter projectile penetrated the plate and struck fast in it; the plate was cracked. The Navy Department will conduct exhaustive tests on Haveyizing armor before accepting more plates.—*Scientific American.*

Wonderful Speed of a New Torpedo Boat.

The Havock and the Hornet proved themselves able so do—one a little over 27 knots, the other a little over 28; but the Daring, built by Messrs. Thornycroft, of Chiswick, beat all records at her trial on the Maylin Sands measured mile, June 23, and attained the unexampled speed of more than 29¼ knots. The run was made against the tide, moreover, and the Daring all the time was blowing off steam hard as though she might, if it had been thought necessary to press her powers to the uttermost, have put on certainly another half knot to her top speed. Having, however, as it was, beaten all records so triumphantly, Mr. Thornycroft preferred for the occasion to let well alone and rest on his laurels. There was no possible doubt about the performance, for it was independently checked point by point by admiralty inspectors sent out in the Daring to report officially on the run, as well as by the special recording instruments set up on board, and by a number of experts, including Sir Frederick B amwell, who watched the behavior of the Daring, chronograph in hand, with the closest interest. The exact figures for the record breaking run were—from sea mark to sea mark, constituting the Admiralty measured mile—time, 2·3 minutes; speed, 29·268 knots; revolutions of propellers, 395.

There were three high speed trial runs on the measured mile in all, after a series of progressive trials to time the mile at various revolutions of the propellers. The Daring, by the way, is a twin screw vessel. The records of the first two high speed trial runs were: No. 1. Against the tide—time, 2·76 minutes; speed, 28·214 knots; revolutions, 373. No. 2. With the tide—time, 2 6 minutes; speed, 28·571 knots; revolutions, 385. The final and record-breaking run 29¼ knots, or 33½ miles per hour, was made against the tide, with a slight sea, and against a strong breeze. In spite of the tremendous pace, the vibration of the little vessel, as she literally tore ahead through the water, was practically insignificant, and the Daring could have fought her guns throughout without inconvenience to steadiness and accuracy of aim.

The Daring's trial trips were carried out under the personal supervision of Mr. John Thornycroft, Jr., and Mr. S. Barnaby, and among those present on board to witness the day's work were Sir Frederick Bramwell, Mr. H. O. Arnold Forster, M. P, Professor Crookes, F R.S., Professor Vernon Boys, Mr. J. T. Thornycroft, Sr, who himself designed the Daring, and Mr. John Donaldson. The brilliant result of the day's performances proved, it was anncunced, more successful than even the builders of the ships had quite expected, and surprised them not much less than it astonished every one else who had the good fortune to be on board the Daring.