several instances of large warships being sunk by locomotive torpedoes discharged from small craft. During the Chilean revolutionary war of 1891, a battleship, the “ Blanco Encalada,” of 3500 tons, was attacked in Caldera Bay by two torpedo vessels —the “ Lynch ” and “ Condell ”—of 750 tons. They entered the bay at dawn, the “ Condell ” leading. This vessel fired three torpedoes which missed the ironclad; then the “ Lynch,” after one ineffective shot, discharged a second torpedo, which struck the “ Blanco ” on the side nearly amidships. The latter had opened fire with little result, and sank soon afterwards. A similar incident occurred in 1894, when the Brazilian ironclad “ Aquidaban ” was sunk in Catherina Bay by the “ Sampaio ”— a torpedo vessel of 500 tons. She entered the bay at night, and first discharged her bow torpedo at the ironclad, which missed; she then fired a broadside torpedo, which struck and exploded against the bow of the “ Aquîdaban.” It caused a great shock on board, throwing an officer on the bridge into the water. The vessel sank soon afterwards, and the “ Sampaio ” escaped uninjured.

In the war (1904-5) between Russia and Japan the Whitehead torpedo did not exercise an important influence upon the naval operations. It scored a success at the beginning of the struggle when a Japanese torpedo-flotilla made an attack upon the Russian fleet lying at anchor outside Port Arthur. For some unaccountable reason, though war was imminent, little or no precautions seemed to have been taken for effectually guarding the vessels. They had no nets in position nor boats patrolling outside them. Thus taken by surprise when the Japanese torpedo-boats suddenly appeared about midnight on the 8th of February 1904, several Russian ships were struck by torpedoes before they could offer any resistance. The most damaged were the “ Retvisan ” and “ Tsarevitch ” (battleships) and “ Pallada ” (cruiser), but all managed to get into Port Arthur and were eventually repaired. With three ships *hors de combat* the Russian fleet was considerably weakened at an early stage. The loss of the “ Petropavlovsk ” in April from a mine explosion was a further discouragement, especially as with this ship went down the gallant and energetic Admiral Makarov. In these circumstances the Russian fleet could not assume the offensive nor prevent the Japanese troops being sent by sea to invest Port Arthur. In June when the injured vessels were fit for service again the fleet put to sea but returned the same evening. The incident is noteworthy only because it led to an attack bý the Japanese torpedo craft on the retiring squadron after sunset. As illustrating the uncertainty of hitting a moving object at sea with the Whitehead torpedo, already mentioned, no vessels were struck on this occasion and they reached the anchorage uninjured. In the battle of Tsushima the Japanese torpedo-boats attacked the Russian fleet after its disablement by gun-fire and gave the *coup de grâce* to some of the ships, which had little power of resistance owing to the destruction of their light armament. This war, therefore, did not increase to any extent our knowledge of the actual capability of this weapon.

*Effect upon Naval Tactics: Blockade.—*It has often been assumed that steam and the torpedo will in future render blockade impossible as it was carried out in the old wars; that, no longer dependent upon the wind to allow egress from the blockaded port, a vessel using steam can emerge when she chooses, while the fear of torpedo attack will deter a blockading squadron from keeping such watch as to foil the attempt. As regards the power conferred by steam, it will be no less advan­tageous to a blockading squadron, enabling it to maintain its position, whereas sailing ships were often driven by gales to leave their station and seek a port. This gave opportunities for the blockaded vessels to escape. As regards torpedo-boats, they would no doubt be a danger to a blockading squadron unpro­vided with a means of defence against these craft. Such defence consists in an adequate number of small vessels interposing an in-shore squadron between the port and the main body outside. Thus they perform the twofold service of watching the enemy’s movements within and frustrating a torpedo attack. As an instance of blockade under modem conditions, we have that of Admiral Sampson upon Santiago—a guard more rigidly maintained than any in the old wars. So little was he deterred by the knowledge that Admiral Cervera had two torpedo vessels in his force, that he drew his squadron closer in at night when an attack might be expected, actually illuminating the entrance of the harbour with his electric searchlights, so that no craft could come out unperceived. No attempt was made to dislodge him from that position, and we may assume that blockade, if required in any scheme of naval strategy, will be carried out, whatever the weapons of warfare.

As regards the effect of torpedoes upon tactics at sea, and in general, as well as single ship, actions, they must operate against close range and employment of the ram. If it is recognized that a vessel within 1000 yds. is liable to a fatal blow, she will endeavour in ordinary circumstances to keep outside that distance and rely upon gun-fire. The exception would be where she is overmatched in that respect, and hence might endeavour to restore the balance by the use of torpedoes. In a fleet action the danger of missing a foe and hitting a friend would restrict the discharge of torpedoes; and this risk increases as formations disappear. But the torpedo must be conceded a tactical superiority over the ram for the following reasons: A vessel to use the latter must come within torpedo range, while her adversary may successfully apply torpedoes without placing herself in any danger of being rammed. The ram can only be used in one direction, and a small miscalculation may cause disaster. If a vessel has more than one position from which torpedoes can be discharged, she is not confined as regards attack to a single bearing or direction.

In action we may consider the speed of the torpedo as double that of the ship, and since against a moving object allowance must be made for the space traversed while ram or torpedo is travelling towards it, the faster weapon is less affected in its chance of successful impact by change of direction and speed of the object at the last moment. Lastly, with machinery disabled a ship is powerless to use the ram, but can avert a ram attack with her torpedoes. The movements of squadrons or single ships on entering an action are not likely to be influenced by any contemplated immediate use of torpedoes, for the gun must remain the primary weapon, at any rate at the first onset. Commanders would hardly risk being crushed by gun-fire before getting within torpedo range. Having faith in the efficiency of their ordnance and the gunnery skill of their crew, they would first manœuvre to bring these into play. Tactics for torpedo attack in such circumstances have not therefore been laid down, and it is only necessary to consider the positions which are advantageous for the use of this weapon, and, conversely, what should be avoided when a vessel, finding herself overmatched in gunnery, seeks to redress the balance with torpedoes.

*Size of Target.—*This, with a ship, varies in length as the torpedo approaches end on to the vessel, or at angle to the line of keel; the greatest being when the path of both forms a right angle. Hence the object is to place your ship where it presents the former condition to the enemy, while he affords the larger target. It must be remembered that, owing to the comparatively slow velocity of the torpedo, it must be aimed not directly at a ship in motion— like a shot from a gun—but at a point ahead which the ship will reach after the torpedo has traversed the intervening distance. Thus speed of object has to be estimated, and hence the importance of adding to the velocity of the torpedo and getting a broadside shot so as to reduce as much as possible errors of calculation. The great increase of the dimensions of warships, especially in length, which now has reached 500 ft., adds to the chances of a successful hit with torpedoes, and will doubtless tend to diminish a desire in future naval tactics to close inside torpedo range for the purpose of ramming.

*Range.—*Though the effective range of a torpedo discharged from a ship or torpedo vessel against a single object moving at high speed may be considered as approximately within 1000 yds. this limit of distance is considerably augmented where the target consists of several vessels at sea in close order, or is that afforded by a fleet at anchor. In the first case it may be worth while to discharge torpedoes from a distance of two or three thou- sand yards at the centre of the line for the chance of hitting one of the vessels composing it. As regards a mass of ships at anchor,