SOMETHING ABOUT MODERN WARFARE

The secretary of the navy recently sent a message to the men of the fleet, says Park Benjamin in the Independent, encouraging them to emulate the example of Admiral Farragut, since which time several journals have referred to Farragut's famous ascent of the rigging of the Hartford during the passage of the forts at Mobile as a proceeding which might with advantage be copied by the commanders of our present ships. The truth is that for anyone to expose himself to an open deck in an action between battleships or cruisers is almost certain destruction, and in all vessels in which the plating of the superstructure is not sufficient to keep out machine-gun projectiles the loss of life will probably be greater than has ever happened before in naval conflicts. Some vessels, though by no means all, are provided with armor; but it is not true, as is generally supposed, that the armor is there primarily to shield the men. Its function is to protect the guns, the motive power and sufficient of the compartments into which the ship is divided to keep her afloat, even if all the others are injured.

PROJECTILES FROM MACHINE GUNS.

In our last war the forts at Mobile and New Orleans used grape and canister shot with much effect at very close range. At long range, shells and the flying splinters of wooden vessels were the principal agents of wholesale destruction. But now the huge shells will begin to come on board from the high-power guns when the contending vessels are nearly three miles apart. The largest guns, twelve and thirteen-inch caliber, can be loaded and fired almost once every three minutes. At a little less than two miles' distance the five and six-inch rapid-firing guns will begin to pour in their projectiles, and these weapons can be loaded and fired at the rate of from seven to fifteen aimed shots per minute. Then come the six-pounder guns, delivering forty shots per minute, the one-pounders, throwing a shot per minute,the machine one-pounders (Maxim Nordenfeldt), two hundred shots per minute, and so on up to the Gatlings, fed automatically by electric motors and projecting bullets at the rate of 3,000 per minute. A man might brave a storm of grape and bullets with a chance of escape; but the battle of the Yalu river showed that under the quick-fire hail of the Japanese ships the slaughter on the Chinese ships was so frightful that the Chinese with all their stolid contempt for death could hardly be kept at their posts. So fierce was the storm of steel around the attacked vessels that the sea was literally lashed into foam by it.

Of course, there is no place on board a warship in action which is ever reasonably safe. The marines stationed in the military tops are likely to be swept out by quick-fire hail, and the coal passers down in the bunkers or the engineers in the tangle of steam machinery are in as imminent danger of death through injuries to the boilers and the scalding of escaping steam.

THE CAPTAIN'S PERIL.

Of all on board the man who stands in the greatest peril is the captain. In the battleships and cruisers his position is in a cylindrical box of steel placed just under the bridge, well forward, which is called the conning tower. The armor of it is thick enough, ordinarily, to resist the penetration of heavy projectiles. It contains the speaking tubes and electrical wires whereby he communicates with the guns, engines and helm, and sometimes apparatus whereby he is enabled to fire the guns himself after they are laid upon the enemy. His field of vision is limited to what he can see through a little horizontal slit on about the level of his eye. In point of frightful responsibility no situation in the world can compare with that which is occupied by the man who stands in that tower and directs the movement of his ship. After the conflict once begins the din about him will be something infernal. Upon him trated, and upon the exterior of that the fire of the enemy will be concen- steel drum in which he is shut up there will be a continuous hail of iron and steel. Shells will burst everywhere around it, and to that babel will be added the roar of the force blast under the engines, the tremendous reports of the heavy guns, and the din of the quick-fire and machine guns in chorus. In such circumstances as this, aided by such knowledge as he can get by looking out through the little peephole in front of him, as well as the smoke will let him, the captain must control the tremendous forces under his command, and his decisions are matters of seconds.

Nobody now believes that a captain who finds his vision through the slits of the tower cut off by smoke will stay thus shut up. It is extremely doubtful if it will be physically possible for him to remain there after the shells begin to hammer its sides and burst against it; and, in any event, the intense anxiety to see and know clearly what the enemy is doing will inevitably lead him to take his chances in the open. Conning tower or no conning tower, his duty is to place himself at whatever point he can manage his ship to the best advantage, and this he will certainly do. Lord Charles Beresford, with grim humor, has suggested that the captain's safest place is not in but behind his conning tower, "because then he has two thicknesses of steel between himself and the enemy, don't you see?" But while conning tower armor may resist penetration, it is by no means certain that the whole structure will not be swept away by the first heavy projectile which squarely hits it.

NO PLACE FOR THE ADMIRAL.

As for the admiral, there is nowadays no rigging for him to ascend, and he would be promptly blown out of it if there were. In fact, after a fleet engagement has begun, there is no place for him at all. He has no business in the conning tower, no business at the guns. He cannot very consistently go below, and he cannot stay on deck. It has been proposed to build a separate armored tower for him, or to take him off the flagship and put him on a small, swift vessel, so that he could choose his position and conveniently give his orders by signals. The difficulty with this would be that the enemy would concentrate his fire on that tower or ship, with the certainty of sinking the latter and rendering the former uninhabitable. The problem, therefore, is still unsolved.

Against the effect of a torpedo, if it gets to the hull, there is no safeguard. The heaviest battle ship is just as vulnerable as the lightest gunboat. The best that can be hoped is that the destruction will be limited to few compartments, so that those remaining intact will be sufficient to keep the ship afloat. But this only puts off the evil hour. As the vessel becomes waterlogged, her speed falls off and her maneuvering capacity is reduced, so that the enemy may then pick his position of advantage and shatter her with his guns or administer a coupe de grace with another torpedo.

Altogether, the prospects of one's coming out of a naval engagement unwounded stand a poorer chance than was the case in the old wooden ships. How the surgeons are to get at them, with the vessel divided into a honeycomb of compartments with no direct interconnection where they can be conveyed directly from the guns without traversing doors and passages intricate and many, is difficult to understand. Those who happen to be stationed in the battleships directly over the torpedo or handling rooms may perhaps be lowered at once to surpeans there placed; but what is to become of the rest in more distant positions is not clear.

THE VALUE OF DISCIPLINE.

All of this goes to show the great advantage of the almost perfect discipline and drill now prevailing in the navy. Indeed, it never has been so completely recognized as it is at the present day that the best protection for a warship's crew is their own fighting capacity. No armor is so efficient as celerity of action and good gunnery. That ship will win, and incidentally save the greater number of lives of its men, which first plants an effective projectile in a vital part of the enemy. The sea fight will not be gained by the ship which withstands the most pounding, but by the ship which pounds hardest and quickest, and so destroys or impairs her antagonist's pounding capacity. It is that swift attack and superior markmanship which, above all else, characterize the crews of the warships of the United States; and it is in just this that the Spaniards are most deficient.

SUBMARINE MINES.

The submarine mine has only one use namely, that of coast defense. In this respect it is superior to all the battleships in the world. Where the battleship leaves off, because it cannot run in shallow water, the submarine mine begins.

Submarine mining began with the Germans, who began using it with great effect in the Franco-Prussian war and kept the French fleet from bombarding the forts. In those days, however, only the crudest of submarine mines were invented, and they did not always explode. They had to be planted in great numbers and experts were satisfied if one out of six responded.

The submarine mine to the lay reader means only an explosive and to even the average close reader the submarine mine is a ball of high explosive so arranged that when a vessel sails over it an explosion will take place and the vessel be destroyed.

Such a mine is, however, far too crude for the use of the navy. It would be very dangerous to locate mines in this loose, uncertain fashion; and it is safe to say that not one of these contact mines now exists, outside of a few small ports.

To explain the use of mines, it is necessary to distinguish between the different kinds of mines. There are three, namely, the "contact," the "observation" and the "ground mine." The observation mine and the ground mine are the ones most in use, and of these two the ground mine is used more than the other.

The contact mine is a simple little arrangement by which a ball of dynamite is lowered to a point about eight feet below the surface of the water. It which rests on the bottom of the ocean. The ball of dynamites has several points which on being touched are driven into the center of the ball and an explosion takes place.

As will be seen, this must be greatly affected by the tides. At times the ball will be a great distance below the surface of the water; again it will be near the surface. All will depend upon the tide.

To do damage to the bottom of an ironclad, the explosion must take place at least eight feet below the water line, and the submarine mine must be located so that it will strike the ironclad six feet under water. This, with the ever-changing tide, is such a difficult matter that the contact mine is almost useless except when the tide is at certain heights.

Another bad point about the simple contact mine is that it gets uncontrollable. The iron sinker, no matter how heavy it might be, is apt to become knocked around by the waves, and the mine gets floated out to sea, ready to do damage to friend as well as to foe.

The mine which is more generally used is the observation mine. This is in three parts. To an observer who can be permitted a glimpse underneath the surface of the water the observation mine consists of three balls. One three feet below the water, another eight feet below the water and the third lying on the bed of the ocean. These three are joined together by a cable. The top one is the observatory. This consists of a globe with two points upon it. On being touched these points sink into the globe and complete a circuit. This circuit communicates with a station on the shore. As the points are driven into the top globe a bell is rung at the station and the engineer in charge realizes that a ship is passing over the mine. He looks out to see if it be a friend or foe. If it is a foe he touches a button and completes the circuit which discharges the mine. The explosive lies in the middle bulb, or the one which is about eight feet below the upper bulb.

In case a friendly ship has passed over the little observatory bulb the engineer does not touch the button and no explosion takes place. These are extremely safe mines and are inexpensive. They can be planted in any harbor without danger to merchant ships.

The big ground mine is the one upon which we rely for coast defense. This mine consists of a very large bulb of high explosive. It lies on or near the bottom of the ocean directly in the channel over which the ships pass. It is connected with the shore by two circuits. These circuits pass into stations which are widely separated. They often lie upon opposite sides of the river so that the officers in charge of the stations which controls the submarine mine are separated by a broad expanse of water.

In order to explode one of the ground mines there must be simultaneous action on the part of the engineers in their stations on opposite sides of the river. They must both act at once or the mine will not explode. The manner in which this done can best be explained by an illustration. Engineer A, on the west side of the river, is seated in a little room. He is provided with a telescope which sights the harbor. Engineer B is on the other side of the river. He is seated in a small room and is also provided with a telescope which overlooks the sea. Both engineers are connected by electric circuits with the submarine mine which lies in the middle of the harbor. The telescopes are remarkable ones that are made by government electricians in the government electrical works. They have no other work to do than to assist in the explosion of the mine.

When a hostile ship is sighted both engineers turn their telescopes upon it. As it draws near both of them keep it in sight, swinging their telescopes as the ship approaches. When it gets directly over the mine the telescopes are focused simultaneously upon it and the mechanism of the telescopes is so arranged that they complete the circuit of explosion and the mine goes off. This is odne without any touch of the button and without any effort whatever upon the part of the engineer. He has only to center his telescope upon the ship and to watch it as it slowly comes up the harbor.

When the explosion takes place, the ship is supposed to be blown into atoms and the work of the engineer is done until such time as another mine can be laid.

This very elaborate mechanism was provided in order to save valuable ground mines from being destroyed prematurely. These mines, in their mechanism and construction, cost the government $5,000 each and were they to be prematurely destroyed it would be a great loss to the government.

It was feared that in the excitement of sighting a warship the engineer might touch the button by accident or might make a mistake in the location of the ship, therefor the twin telescopes, each with their automatic circuits were arranged on opposite ports, and with great success. This has not been tried upon a warship as yet, but its experiments have been so highly satisfactory that there is no doubt of its successful working at the critical moment.

It is estimated that it needs a pressure of 12,000 pounds per square inch to blow a hole through the bottom of a modern warship. This is an immense power, and while it worked in the case of the Maine it might not do as well with a ship in motion. The Maine lay at anchor in Havana harbor and was an easy prey to the mine, which was unodubtedly raised until it almost touched its bottom. But with a ship in motion on a tossing sea it will be difficult to lay the mine against her and therefore much of the power might be lost.

In case of the loss of power, engineers estimate that the explosion would damage the ship's mechanism very seriously and the mere force of the explosion would cause its engines inside to explode and the ship would blow itself up. If no explosion were to take place the boilers at least would be damaged and the whole ship thrown out of working order. Gun cotton, dynamite and explosive gelatine are the high explosives used at present with submarine mines.

In every port of the United States there is a carefully devised system of mines, and in case of the instant destruction of a mine all the forts are equipped with storehouses, and there is every preparation to restore them at a moment's notice.

There was considerable consternation caused in naval circles two weeks ago when it was learned that the submarine mines at Fort Wasdworth had been cut, presumably by a Spanish spy. Naval officers, however, restored these mines so quickly that the secretary of the nevy gave himself no uneasiness about them.

THE ARMY MULE.

There is great activity in the mule market of St. Louis and Kansas City, Mo., Memphis, Tenn., and Louisville, Ky., consequent upon the fact that the government is buying up every available mule of standard weight and proportion for use in the army of Cuban invasion.

The army mule won his place in history during the civil war. A great general said that in war soldiers were necessary, but that mules were indispensable.

The qualities which make the mule more serviceable in battle than the horse are his hardiness, his equanimity and his judgment. This last article has been named stupidity. That is a libel.

The mule is conservative, but well balanced. He never loses his head. He does not get excited. Even when he is indulging in a runaway he keeps cool and steers clear of danger, where a horse would plunge blindly into it.

The horse is the mule's superior on the battlefield only for purposes of flight, and as there is going to be no fleeing on this side of the line in Cuba the mule's lack of speed will not interfere with his usefulness.

Dr. Edward N. Farrell, the government mule expert at St. Louis, says that for army purposes mules are divided into four classes. There are wheel mules, swing mules, lead mules and pack mules. The wheel mule is the largest, and is so called because he is hitched nearest the wagon. He is the king of army mules.

"He is the long-legged, big-eared, short-buckled animal that is supposed to hunch himself up and pull like blazes when the wagon gets stuck. This is merely a supposition, however. Maybe he will do all these commendable things and maybe he wont. It depends entirely on how his last meal agreed with him and whether he is in the right humor. The mule disposition is uncertain, and Uncle Sam's animals are no different from any others in this respect. In addition to being 16 hands high, the 'wheeler' must weigh at least 1,200 pounds. When he throws that weight of bone, muscle and stubbornness into any cause, be it good or bad, something is sure to come.

"The 'swing mule' is the middleman in a six-animal team. He is the chap that takes up all the slack left by the 'wheeler.' He must be 15½ hands high and must weigh about 1,050 pounds. So far as his other peculiarities are concerned, he is much like the 'wheeler,' only worse, because a shade smaller.

"The 'lead mule' is the animal that pulls along to suit himself ahead of all the rest. He is a chunky, 15-hand animal, and weighs about 950 pounds.

"Last, but not least, is the 'pack mule,' a blocky animal, 15 hands high, and weighing an even 1,000 pounds. The pack mule is supposed to carry a load larger than himself. I don't think it has ever been definitely ascertained just how much he can carry. At any rate, the 'packer' always feels justified in strapping on his back all that can be piled on. The average price of the army mule a week ago was $94, but the price is steadily advancing under the demand."

Some few years ago a well known gambler of this city went to one of the principal churches one Sunday, and was seated by the usher in the pew of an old and conservative New Yorker, who came in later, and, on finding the gambler seated in his pew, handed him his card, on the back of which he had written, "This is my pew." The gambler returned the card, having written on it "A pretty d—d poor pew."

"If," mused the suburbanite, who had been reading the poem beginning:

"O, for a lodge in some vast wilderness—"

"If Cowper were alive today he would have a hard time dodging the folks who are anxious to dispose of suburban residences at a sacrifice."

BRAVE CUBAN WOMEN IN WAR TIME.

So much imaginary stuff has been circulated about Cuba by valiant war correspondents who remained at safe range from the island, that one hardly knows where to draw the line between fact and fiction, and doubtless, while sometimes being fooled by clever falsehoods, we have discredited strange things which actually occurred. At first nobody really believed that there were women in the Cuban army, though the newspapers printed romantic tales of their exploits. The truth is that from the outset female soldiers have played no unimportant part in the struggle for independence. General Weyler admitted their dangerous zeal when he first assumed command in Cuba. In an interview with an American corespondent he said: "Yes, we captured a woman yesterday. She was white, too, and good looking. Most of these Amazons are colored. This one was dressed in men's clothes, astride a powerful horse and wielding her machete like the devil. These women soldiers are fiercer than men, they ride and fight like furies. Where is she now? In Morro Castle, of course. What will be done with her? Well"—and a characteristic shrug, accompanied by a gleam in the cruel eye which boded no good to the captive, finished the sentence.

Maceo, the mulatto insurgent leader, had more than 100 female soldiers (mostly colored) in his company. Gomez also had a good many, and so has Calixto Alvarez, the chief from the eastern district of San Jago de Cuba. The majority abandoned small farms and plantations to follow the fortunes of their husbands, and though all carry machetes and revolvers, their chief duty is to gather up and succor the wounded that fall in battle. Many of them are wives and mothers—women of dignity and eduction—not coarse and shameless Amazons such as the Spanish authorities have described. As a race, the Cuban women are the most true-hearted, simple and domestic in the civilized world, devoted to their homes and adoring their husbands and children. They are ardent patriots too, and have shown themselves stronger than their lords in adversity and more serene in martyrdom. But their cheeks grow pale at the thought of innumerable crimes committed upon their sex in this and other Cuban wars. The first went to the field with their husbands and fathers for the sake of protection. While misrule prevailed through the island—Spanish soldiers and murderous banditti infesting the highways, looting plantations and perpetrating all manner of atrocities—no woman was safe at home without her natural protector. In some cases gentle ladies were transformed into avenging furies, seeing their loved ones butchered. Afterward they fought shoulder to shoulder with the men, led daring raids and applied the torch in a thousand places; and many of them now sleep in unmarked graves. Many women, not "trained" or Red Cross nurses, are caring for the sick and wounded in insurgent camps. Children have been born upon the battle field, whose mothers did not fear death so much as the horrors that might await them at home.

Mrs. Kate Masterson, who, by the way, has written some most graphic pictures of life in Cuba, speaks of woman's part in this war as follows:

"From this beautiful summer land one cry goes up which is heard over the din of battle and the clash of arms. It is the wail of the desolate women. They are mourning for their loved ones and their tears are falling upon new-made graves all over the island. Their soft eyes have looked upon ghastly bonfires in which the bodies of their babies have been the fuel which fed the flames. Their cry is more eloquent than all the ruin and desolation in this fair land of graves. Like Easter lilies, bent and stained with patriot blood—like the roses, trampled in the earth and drenched with mire, are the hearts of these poor women. Many of them have lost all they possess through this war—not only husbands, sons and daughters, relatives and friends, but their plantations have been burned and their fortunes swept away. They are willing to give everything to Cuba—glad to see their sugar cane go up in smoke since thereby its revenue will be lost to Spain. Some of them sold their jewels when all their money was gone, in order to send medicine and lint to the rebels. In every Cuban home a sum is set aside out of each day's household money to send to the field."

There have been traitors in Cuba—but they were never women. As a rule they are better conspirators than their fathers and brothers, because they know the value of silence. They are tireless and successful in their efforts to get food and medicine to the rebels, and word from one scattered band to another. Delicate senoritas, reared in southern seclusion, dressed in boys' clothes, steal out at night to the nearby haunts of lovers or brothers, in the "long grass," as the insurgent camps are called. They secrete food in false pockets, hide letters, whose envelopes have been dipped in ink, in their abundant black hair; carry medicine in their scent bottles and umbrella handles, cloth for clothes or bandages in the lining of their garments. One girl, the only daughter of a once wealthy family, has many times carried dynamite to the woods in eggshells deftly put together. Disguised as a vender, she has had many thrilling experiences. Her narrowest escape was when a Spanish soldier stole the basket of supposed eggs and prepared to cook them by the wayside. Nothing saved her then but a sudden call from headquarters which the soldier dared not disobey.

There is no end to the well-authenticated stories that are told in this line. Here are a few of them: The very first insurgent band of the present war had its romance. It started in Matanzas province, and its chief was Antonio Lopez Coloma. In February of 1895, while his party was hiding in the woods, near the Ignacio mill, his fiancee, Senorita Amapara Obre, ran away from home and joined him, determined to share his fortunes, whatever they might be. The party was soon captured, and the lovers shut up in the old San Severino castle at Matanzas, but at opposite ends of the fortress. The girl was soon released, but Coloma remained some months in durance vile, and was then transferred to the Morro, in Havana. Miss Obre followed, and they were married in prison.

Before Vebuitas village was garrisoned some arms belonging to a local company of volunteers were gathered in a certain house. The rebel chief, Esteban Tamayo, hearing of this, went with fifty followers to the residence of the captain of the Spanish volunteers and demanded that the arms be given up to him. No resistance was made, and Tamayo and his men were soon provided with guns and cartridges, only to discover that they had been rendered useless. Disappointment made the rebels furious. The Spanish captain was quickly court martialed, ordered to be shot forthwith, and the customary number of men was detailed to carry out the sentence. At the critical moment, when the victim stood looking into the muzzles of the rifles aimed at his breast, a young woman sprang between, and facing the rebels, cried: "He will not die before you have killed a Cuban woman." This brave act of devotion so pleased the executioners that they lowered their guns and left without carrying out the sentence.

Among the early dramatic incidents of the war was a marriage ceremony performed at dawn in the mountains of Puerto Principe. Don Robeau, a handsome, well-educated young man, heir to a large estate, was one of the first to enlist with Gomez as a private. He has fought bravely and been advanced step by step, till he is now major of a regiment recruited by himself from his own neighborhood, composed entirely of his personal friends, who are all finely-bred young men. Robeau was in love with a young girl who lived in a small village near his father's estate. She was in humbler circumstances than he, and the rigid rules of Cuban etiquette kept them apart. But when the young major first marched through the town with his splendid company of men their horses' bridles were braided with ribbons, and they wore palm wreaths twined around their hats in her honor.

They passed the girl's home and saluted her as she stood on the balcony with her mother. Robeau went in and asked the parents if he might marry their daughter, and take her with him, as he feared some harm might befall her in his absence. But the old folk would not consent, and finally the young lover yielded to their wishes and marched sadly away. Two days later, when he had gone many miles, the girl dashed to his side mounted on a horse. She had run away from home to join her sweetheart. That night Robeau sent a guard of two men with an extra horse and empty saddle, to the house of the nearest priest. The terrified padre, expecting to be killed despite the assurance of his escort, mounted and rode with them, muttering ave marias all the way. They reached the hills where the regiment was halted just before daylight; and as dawn broke from the east the yiung people were married. They are now at Santa Clara, where Major Robeau has command of 400 men, operating with Seraphine Sanchez and his band of 4,000.

When Damian Hernandez was sent, a political exile, to the Isle of Pines his wife accompanied him that she might liberate him at the first opportunity. One day, when he was working with the other prisoners cutting wood, she engaged the guard, with whom she had previously made herself familiar, in friendly conversation. Taking his gun, on pretense of examining it, she suddenly leaped backward and pointing it at his head threatened him with instant death if he moved. Then her husband and his comrades tied the unfortunate man and fled to the coast. There they compelled the captain of the schooner Margrita to sail for Zapata, which they reached in safety and later they made thier way to the revolutionary forces, where Mrs. Hernandez acts as nurse.

Another notable woman is the wife of Dr. Hernandez of San Cristobal. She is young and beautiful, and now in the field with her husband, taking an active part in the fighting. She had only been married a year when her husband was called upon to organize a band of men. He came to his young wife, who was about to become a mother, and told her that he would do just as she had willed, for he felt that his life belonged to her. She answered that she wished him to go to the war. In a week he had raised a band of 500 men and as they marched out of town they saluted Mrs. Hernandez, passing her house and shouting "Viva the Queen of Cuba!" When the baby was a few days old the Spaniards took possession of the town. One of the lieutenants rode into the Hernandez parlor on horseback and subjected the young mother to threats and insults. That night she got a horse and with the child in her arms went to join her husband, riding many miles through the Cuban hills until she found him.

TORPEDO BOAT DESTROYERS.

"There is no kind of a naval vessel that could be conscientiously recommended in time of war as a sanitarium," drawled Captain Schley one day to me in his inimitable way. "But of all the various craft, big and little, that constitute a modern fleet there is none so thoroughly undesirable to the searcher after a safe and easy berth as a torpedo boat."

The man on the torpedo boat has three-sixteenths of an inch of steel between him and the sea that is hungrily watching its chance to swallow him. The boat could be cut in two with a can opener. Not only would its walls give way like tissue paper before the fire of great guns, rapid-fire guns and machine guns, but they would not resist a bullet from a hand rifle, or even a good sized revolver.

On an ordinary vessel there is some chance of getting behind something that might conceivably turn a projectile. The crew of a torpedo boat is practically in the open air. Any shot that strikes the open craft will search it from end to end like an X ray.

Torpedo boats are divided into three classes. The third class now is considered obsolete. They were small enough to be carried aboard a ship, for they were thirty-tonners, the second class boats were about sixty-five tons. They were intended for harbor service only, and were not seagoing.

The first-class boats are sea-going craft, but are intended to operate from a base, for the coal and water storage capacity is limited. This precludes a torpedo boat from cruising more than seventy-five to eighty miles from its base of supplies. This is the kind now relied upon in the navy.

First class boats vary in tonnage from 115 to 175 tons, in length from 140 to 190 feet, and in draught from five to eight feet. They are perfectly seaworthy and can ride out the heaviest gales. The armament consists of three to four eighteen-inch Whitehead torpedoes and three or four one-pounder machine guns. In addition there is a revolver and two or three rifles for each of the twenty-two to thirty men, the rifles supplied with sword bayonets to repel boarders.

The biggest kind of modern destroyer has a length of 220 feet, with a beam of 26½ feet. The horse power is about 6,500, driving the boat at a speed of thirty-one knots or more. The engines are triple-expansion, with water tube boilers. They carry from seven, to a hundred tons of coal, and at a speed of eight or nine knots can keep the sea for a week; so they are independent of coaling in a voyage of between 1,300 and 1,500 miles. They carry a crew of about three or four officers and about forty men. The engines, as you can see, are all out of proportion to the craft they drive.

The torpedo flotilla in the war fleet lying off Key West is a little fleet of itself, commanded by Lieutenant Commander W. W. Kimball. It consists of the Foote, Lieutenant W. L. Rogers commanding, Ensign R. H. Jackson; the Cushing, Lieutenant A. Gleaves commanding, Ensign F. P. Baldwin; the Ericsson, Lieutenant R. N. Usher commanding, Passed Assistant Engineer O. W. Koester, Ensign L. A. Bostwick; the Winslow, Lieutenant J. B. Bernadeu commanding, the Porter, Lieutenant J. C. Fremont commanding, Assistant Surgeon I. V. Gillis; the Dupont, Lieutenant S. S. Wood commanding, Ensign F. H. Clarke, jr.

The Cushing is one of the best known of the torpedo boats in the navy. It has the longest cruising record, and is known all the way from Galveston to Bath, Me. Its engines of 1,820 horsepower, can drive it twenty-three knots (a knot is 1 1-16 miles) an hour. To do this its twin screws, each 2 feet 2 inches in diameter with a pitch of 8 feet 4 inches, must make 450 revolutions a minute. Each of its engines has five cylinders, increasing in diameter from 11½ inches for the high-pressure cylinder to 22½ inches for low-pressure cylinder, with a stroke of 15 inches. Each of the two water-tube boilers has 950 tubes. Steam is used at a pressure to the square inch (100 pounds is a good pressure on an ordinary boiler) and the boilers develop 1,820 horse-power.

In dividing such a craft up internally usually the sharp knife-edge bow is shut off six or eight feet abaft the stem from the remainder of the boat by the collision bulkhead. This division is made, first, because nothing could be stowed away in so narrow a place so far forward, and second, to insure the safety of the boat in case her bows get stove. To stave in the bows of a torpedo boat is really quite as easy as falling off a log, for the boat in all her parts is made as light as possible. The skin plating is of the thinnest steel, the frames are of light weight, the longitudinals are mere strips of metal. So thin and frail is the construction of the boat that if she bumps or runs into anything she will be bent out of her shape, and should her bow strike any hard object—like a floating spar or the spile of a dock—it would be turned back upon itself and twisted all out of shape, in much the same way as a stiff piece of paper would be after being crumpled in the hand.

The mission of the torpedo boat is to get close to a warship, fire its shot into the weakest shot and sink the ship. Lying low and going at a great rate of speed it is supposed to act like a little David killing his Goliath. It runs up to him, strikes him, strikes him again and again, and then either falls or sees the enemy go down.

No greater heroism is required than this for any task of modern times.

The crew is a picked one. Fat men are not wanted aboard torpedo boats, nor men who tower head and shoulders above the average crowd. Space is so valuable on one of these little marine sprinters that the cook sleeps in the pantry and the men have to go ashore to salute their officers. All dress in overalls like laborers and look more like bricklayers than marines.

It is always considered important in warfare to bring the men into action in good physical condition, well fed, comfortable and with plenty of sleep. Service on a torpedo boat is destructive to all these requirements. The terrific vibration of the paper-shelled hull, plunging through the water as the speed of an express train, unsettles the strongest stomach. It is impossible to eat or sleep with comfort—in fact, in the British naval maneuvers the favorite menu for the officers of torpedo boats has been confined to egg-nog.

The service, even in peaceful exercises, is so arduous that the crews have to be changed at intervals of a few days.

There is a warship on the horizon. It has to be destroyed. Who can do it except the torpedo!

The captain looks at his picked crew. "Ready boys!" means ready for death. Talk of desperation in the charge of the Light Brigade—there were hundreds of survivors at that charge, but here is a dash from which nobody expects to return alive, and in which the only hope of the men who make it is that they may hold out long enough to bring their enemy down with them.

Quiet groups stand by the rapid-fire guns. Suddenly a search-light flashes on the horizon. It sweeps the sea from side to side, and at last it touches the torpedo boat and remains fastened upon it while every man is outlined in merciless sharpness. It is the searchlight of the enemy. The pent-up steam crowds into the cylinders under the lash of the forced draught and the boat plunges along the path of light on its race of death. There are two miles to cover before it will come in striking distance, and already the splashes of pattering shots in the water tell that the enemy's secondary battery is finding the range.

The nerves of every man on board are keyed up tense as harp strings. The eyes of the lookouts peer fiercely through the blackness in which, with all lights out, the hostile battleship lies ready to pour destruction on anything that approaches.

The method of attack must now be considered. There are two ways, one is to steam up to about 600 yards bows on, stop, fire, and then back straight out. The other is to steam up, turn around, firing from the deck tubes while turning and steam back at fullest speed. The advantage is that the least surface of the boat is offered as a target to her enemy.

In the second case the objection is that, while turning, the entire side of the boat is at the mercy of the enemy's guns, and the boat's stern with steering gear, etc., is exposed to damage while running away. The advantage in this last method rests in the opportunity of firing the after torpedo tubes and in the shorter time the boat is under fire in the danger space. Like lightning the captain must decide.

The man behind the gun is the more important than the gun itself or the ship that carries it.

He has developed his skill until he can put four shots out of five into a large target at 2,000 yards; but will his training serve him now, or will "buck fever" shake his nerve and destroy his aim? Yesterday his record in practice might have been absolute perfection, and nobody outside his ship would have thought anything of it. Today the world is waiting to hear of his work, and two nations are hanging in feverish dread on the result.

Will the responsibility unnerve or bewilder him? It all depends on the stuff the man behind the gun is made of.

The hail of projectiles from the battleship's machine guns is doing its work. The torpedo boat is riddled; the water is pouring through a dozen leaks; dead and dying men are lying all about the decks; the speed is falling off. But still the shots have missed the torpedoes, the premature explosion of one of which would leave not a relic of the craft or its crew; still there are men enough, standing grimly by the tubes, to do their work, and the boat staggers onwar dto its prey. At last the moment has come. Eight hundred yards. The helm goes hard over, the boat begins to swing around, and from two of her tubes go speeding messengers of destruction. The enemy's battleship goes down.