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MAIN FEATURES OF THE SPANISH-AMERICAN WAR.

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WHILE the events of the war lately ended show nothing which might lead to a radical revolution of present ideas as to rational warfare and the use of modern war material, and while no essentially new appliances have been made use of which might cause us to anticipate a change in the floating material or the weapons of the sea Powers, still the war has enriched former experiences. But, on the other hand, it might lead to erroneous conclusions, as many good devices did not have a chance to be tested, the weakness of the adversary making them superfluous, and others not good did not have bad results, because they were counter-balanced by the defects and mistakes on the part of the enemy or by other favourable circumstances.

The following is a discussion of the points which are of special interest to the naval officer :—

I.—BATTLES OF THE FLEET.

Aside from the moral qualities of the *personnel*, which constitute the prerequisite of success, there are five main factors on which the result of a battle depends : the construction and equipment of the ships, the artillery, the torpedo, the ram, and speed.

The torpedo and the ram were not used in the late war, for the reason that the hostile ships never came close enough to each other. It is claimed, it is true, that two Spanish torpedo-boats attempted an attack at Cavite on May 1st. But these two vessels were so entirely covered by the rapid-fire artillery of the "Olympia," even at a distance of 2,000 metres, that they could only save their crews by running ashore as fast as possible. It is doubtful whether they were really torpedo-boats. If so, the attack could only have been made owing to entire inexperience with torpedo-boat attacks and complete ignorance of modern rapid-fire guns.

The other two factors, artillery and speed, proved to be of much more essential and indeed of a very powerful effect. The superiority of the American artillery as to number, calibre, and kind of guns is well known. The general opinion is also that the shooting of the Americans was very good, while that of the Spanish was miserable.

This was the more essential for the Americans at Cavite, owing to the fact that a large number of their shells did not explode. If nevertheless they achieved such a complete success and caused such destructive fires, it was because of the comparatively large number of hits; there were still quite a considerable number of shells that did explode. Even as early as at the bombardment of San Juan it was discovered that many of the shells did not explode; but this fact was most noticeable at the naval battle of Cavite. It is true that at the end of the battle all the Spanish vessels were under water to the upper deck, so that the really mortal injuries could not be verified; the parts above water showed a number of hits, and there is no reason for the assumption that the ratio of exploded shells to that of unexploded ones was essentially different in the lower parts.

The "Reina Cristina" showed ten shots that had gone entirely through the vessel; the after funnel had been torn down by the falling of the mainmast; no explosive effect could be noticed. However, the whole ship had been burned out, which made accurate observation difficult.

The "Castilla" showed considerable explosive effects. The funnels and metal bulkheads of the upper deck were pierced in different places by fragments and splinters. The conning bridge and superstructure deck were completely destroyed and torn down.

On the "Don Antonio de Ulloa" the masts were pierced in several places; a 5.7-centimetre shot had gone clear through a 12-centimetre gun shield; the chart-house and the starboard side aft showed two hits each, in which there had been failure to explode.

The "Don Juan de Austria" was burned out; effects of firing could not be observed.

On the "Marquis del Duero" the tube of the 12-centimetre starboard gun was bent upward; the cause of this could not be ascertained. Two shots had pierced the ship's side. The upper edge of the funnel had been indented by a projectile. No splinter effects were noticeable.

On the "General Lezo" the demolition of the funnel was apparently due to an explosion.

The "Isla de Cuba" showed no injuries.

On the "Isla de Luzon" the 12-centimetre forward gun, with its whole pivot and shield, had fallen over backward in firing. Two shots (presumably 4-centimetre) had gone through the bow; one of the masts had been grazed by a small-calibre shot. The engine telegraph and superstructures had been demolished; the helm upturned by splinters.

On the "Argos" nothing could be observed.

The "Velasco" had the foremast pierced and slightly burned, the mainmast torn down, and the anchor stock shot off.

When the American fleet advanced for the attack it was fired upon by a battery at Manila. The "Olympia" answered with two shots; both shells were afterwards found unexploded near Luneta. The governor's house at Cavite also showed a shot without explosive effect.

In this respect better results appear to have been achieved at Santiago. This may be gathered from the details known, although the reports refer only in a few instances to the explosive effects attained; but even here a number of cases of non-explosion were noticed on the Spanish ships, as well as the fortifications.

The following table gives some *data* concerning the hits in the naval battle of Santiago:—

American Guns.

	American designation.							Total.
	1-pounder.	6-pounder.	4-inch	5-inch	8-inch	12-in.	13-in.	
Calibre in centimetres	3·7	5·7	10	12·7	20	30	33	—
Number of guns on board	22	84	6	12	32	6	8	170

Hits.

Maria Teresa	1	17	1	4	3	2	—	28
Almirante Oquendo ...	—	46	6	3	7	—	—	62
Vizcaya	—	11	4	6	45	—	—	66
Cristobal Colon	—	5	—	2	—	—	—	7
Total	1	79	11	15	55	2	—	163

This is not quite 1 hit per gun, or, leaving out the 1-pounders, which have only a short range of fire, 9 hits to 8 guns.

The "Iowa" is the only ship that has 10-centimetre guns, the "Brooklyn" the only one having 12·7-centimetre guns. These *data* can not lay claim to absolute accuracy, owing to the extent of the destruction. The calibres of the hits also admit of some margin.

Special mention should be made of the following points:—The fallen foremast of the "Maria Teresa" showed 2 hits; 10 hits from 3 ships went into the funnels.

On the "Almirante Oquendo" a 20-centimetre shell went through the forward turret roof, exploding, and killing the whole crew in the turret. If the turret had had no roof the shell would have passed over it.

The superstructures on the deck of the "Vizcaya" had been almost completely destroyed by the end of the battle. Whether the torpedo which lay ready for firing in a bow launching tube was detonated by a hostile projectile could not be definitely established. It has also been said that the forward ammunition magazine had exploded.

A 20-centimetre shell hit the protective shield of the second 14-centimetre gun of the "Maria Teresa," exploded in the rear of it, and killed and mutilated everyone in the vicinity, as did also another shell of the same kind which struck the battery deck aft. Still farther aft two 30-centimetre shells struck so close together that their shot holes merged into one. Explosive fragments from them had torn a hole 4 feet square in the ship on the opposite side (starboard).

The "Cristobal Colon," although having received but seven shots, gave up the game, seeing that there was no possibility of escape, as even the "Oregon" and "Texas" had caught up with her after a three hours' chase.

In no case was an armour belt pierced. The greatest destruction comparatively was wrought by the 5·7-centimetre projectiles, while the efficacy of the 3·7-centimetre projectiles was very small, their range not exceeding 2,000 metres. They are therefore to be done away with, perhaps a little over-hastily, since they were constructed primarily as against torpedo-boats and for use at comparatively short distances.

In connection with the hits, a few figures as to the consumption of ammunition may be of interest, while the total consumption of ammunition has not been ascertained. Smith, a seaman on board the "Iowa," fired 135 aimed shots from a 10-centimetre rapid-fire gun in fifty minutes. During the same period of time two 5·7-centimetre guns of the same ship fired 440 shots. The "Oregon" used in all 1,775 shells, but 1,670 of this number were used for the twenty 5·7-centimetre guns alone (or perhaps only for the ten of one side of the ship), while the four 30-centimetre guns fired 31 shots.

The American material demonstrated not only its efficacy but also its durability, as only four guns were in need of repairs at the end of the war, in all of which projectiles had burst in the bore. This fact, taken in connection with other frequent failures of fuses, shows that the construction of the fuse in America is still far from perfect.

It is well known that the extensive fires on board the Spanish ships were due principally to the fact that the Spanish had not sufficiently considered modern experiences and principles by removing everything combustible from the ships. One circumstance should be mentioned in this connection which has perhaps not been fully appreciated, namely, the danger of wooden decks with pitch in the seams. The danger of these decks was still further increased in the Spanish ships by the circumstance that the planks were not even resting on an iron deck. An iron lining excluding the air and being a conductor of heat naturally decreases the danger of a fire spreading, though it does not obviate it, as the splinters of exploding projectiles pierce the deck, thereby causing draughts of air from below. On the "Maria Teresa," "Almirante Oquendo," and "Vizcaya" the upper decks and all the woodwork were completely burned, other decks partially.

The Americans had avoided all combustible material in the construction and equipment of their ships; and moreover, special orders were given at the beginning of the war that all the ships should be examined and everything combustible that might have been left or accumulated on board through carelessness should be removed. Besides, the Spanish appear to have relied entirely on their steam pumps and water mains for extinguishing fires. When these had been destroyed or injured by hostile projectiles, they had no other means to fall back on. Even the most primitive means for fighting fires, such as fire buckets and tubs filled with water, are indispensable in connection

with our modern fire-extinguishing equipment which is very effective indeed, but also very complicated.

The thick powder smoke sometimes suffocated the Americans and almost blinded them. They sought to remedy this by tying wet cloths over their heads with small holes cut into them for their eyes. Smokeless powder would probably have had still more troublesome effects.

The range-finders, to which the good firing results of the Americans were often attributed in the beginning, were not of much use. Owing to their delicate construction, their usefulness was soon impaired. The distances were then estimated from the height of the masts of the hostile ships.

While the Spanish were inferior in every other respect, they might have averted the whole sad catastrophe of Santiago by preserving and taking advantage of their greater speed, which they had shown, at least, at the trial trips of their ships. In this respect the Americans were at a great disadvantage from the outset.

The speed of the two armoured cruisers "New York" and "Brooklyn" was superior by 1 knot to that of the Spanish cruisers, but these were the only ones; the speed of all the other vessels was inferior by from $2\frac{1}{2}$ to 5 miles. The American ships, aside from previous services required of them—the "Oregon," for instance, had not reached Key West on her return from San Francisco until May 26th—had been blockading Santiago for five weeks. Their boilers were in constant use and could not be properly cleaned; the bottoms of the ships were badly fouled. It is claimed that in order to make 11 knots an hour the ships had to use as much coal as they required to make 16 knots, when in good condition, and even then they could not attain their original speed. The Spanish, on the other hand, had a good opportunity during their six weeks' stay in Santiago Harbour to put their boilers and engines in first-class condition and to clean the bottoms of the ships.

Here, again, the moral qualities of the *personnel* are of the greatest importance. Technical perfection is but an auxiliary in warfare—a 0 which acquires value only by the figure placed before it, namely, the mental qualities of the warrior. It is doubtful, however, whether the Spanish ships ever actually possessed the speed officially claimed for them. At trial trips it is easy enough to use means by which the efficiency attained appears greater on paper than it is in reality, especially if the *personnel* accepting the ship is not of the highest moral and technical standing. In any event, the Spanish engine *personnel* was not equal to its task.

It did not need this war to establish the value of an efficient engine *personnel* for success in war; but the immensity of the catastrophes must make it plain even to the most superficial mind that it would be very wrong to deny the importance of the services of the men who give life and motion to the ship by the most arduous kind of work simply because they do not handle shell and lanyard, but coal shovel and fire hook. The very best of human material, strong in body and mind, is the only kind suitable for this work, and a Navy should spare neither trouble nor expense to secure it.

On the subject of the efficiency of monitors, opinions in United States naval circles were much divided at the beginning of the war. The United States are the only ones who still continue to build this type of ship. Little was heard of their services during the war. Two of them went from San Francisco to the Philippines, the greater part of the way in tow of their colliers. The "Monterey," accompanied by the collier "Brutus," left San Diego, Cal., on June 11th and arrived at Manila on August 4th. The distance is 7,600 miles, 3,725 miles of which she was towed. Twice she had to touch at anchoring places, namely, at Hawaii and Guam. She was towed, from the 8th to the 23rd of June, 712 miles; from the 5th to the 22nd of July, 2,541 miles, and from the 25th to the 28th of July, 472 miles; average speed while in tow, 6.76 knots. The weather was fine during the whole time, with the exception of a slight storm on July 31st. The voyage took in all two months less seven days. The "Monadnock" took exactly the same length of time, having left San Francisco on June 23rd and arrived at Manila on August 16th.

These voyages are quite remarkable as far as sea efficiency is concerned, but when it comes to war efficiency they had better not be relied upon. The confidence in the efficiency of the monitor for war purposes has been considerably shaken. Captain Mahan, who used to argue in favour of a defensive Navy composed of monitors, has recently expressed the opinion that the inefficiency of the monitors had now been proved; that they had been a constant impediment to the fleet owing to their lack of speed, limited coal capacity, and unstable platforms, which completely excluded effective firing in a bombardment. For harbour defences also he prefers land fortifications to monitors.

II.—BOMBARDMENTS.

What might be the results of a serious battle between armourclads and coast forts the war did not demonstrate. The Americans in these instances never went close enough to make it possible to note decisive results on either side of the belligerents. They should not be blamed for this. If they could obtain their object without taking greater risks, it would have been a mistake to take such risks, and they certainly did attain their object. The great injuries, however, which the Americans claimed to have inflicted at different times have subsequently proved to be exaggerations and delusions. Even at target practice we believe only reluctantly the statements of "too short" or "too far" made by an observer favourably stationed. The claims that the forts had been silenced, which would presuppose that the guns had been dismounted, were also founded on delusion.

There is no doubt that the Americans had better guns than the Spanish in their land batteries and could fire at distances which the Spanish guns could not reach. When this was recognised ashore and the firing stopped, the ships thought they had silenced the batteries. It has therefore been demonstrated that the ships were unable to seriously injure the land fortifications at great distances. After all the bombardments of Santiago there was but one gun dismounted in each of the

batteries at the Morro and the Socapa. It has not been demonstrated whether with equal armaments and skill in firing on the part of the Spanish the ships would not have seriously suffered. Still less has it been demonstrated what the relative situation of the belligerent parties would have been if shorter distances had been chosen.

The employment of torpedo-boats for bombardments, as at Cardenas, must be designated as entirely unsuitable. Torpedo-boats are expensive and delicate vessels, equipped for launching torpedoes and for great speed. Their guns are intended to be used only in extreme cases. When the torpedo weapons can not be used their other principal quality, speed, in connection with the circumstance that they draw little water, may be utilised for the transmission of orders and information ; but bombardments, even in narrow and shallow waters, had better be left to the most primitive gun-boats, etc. ; they can do better work and are less expensive, but can never take the place of a disabled torpedo-boat.

The so-called dynamite cruiser, "Vesuvius," was a failure. Her projectiles can be fired only at medium and short distances, and can not be aimed. The terrible effects claimed for hits can not be considered as counterbalancing this. It is true that an accidental hit may cause great havoc, but in this age of accurate firearms we should no longer reckon with such uncertain factors. The Americans have utilised the vessel accordingly. They used to send her at night against the coast defences, counting on accidental hits, while the vessel, protected by the darkness, did not betray her presence by any flash at the discharge nor by smoke or detonation. Nothing has been heard of any particular result. No attempt was made to carry out the idea, so much talked of at first, of destroying the mine obstructions by systematic bombardments of the harbour entrance. In order to do this it would have been necessary for the vessel to approach the shore in daytime, when she would have been exposed to the very dangerous fire of the coast forts, and a systematic bombardment could hardly be spoken of in view of the uncertainty of fire.

The Americans consider this vessel a failure, as also the ram "Katahdin," which, aside from four rapid-fire guns, has no other weapons but her ram.

III.—COAST DEFENCE.

Some obstructions by means of vessels and mines were laid out by both belligerents, but did not come into play. The Spanish had attempted to close the entrance of San Juan Harbour in Porto' Rico and that of the Pasig River at Manila by sunken vessels. In the latter case it was the opinion of German officers that it did not constitute a military obstruction, although it interfered considerably with the movements of shipping.

The two mines which were blown up in front of the "Olympia" at the beginning of the battle of Cavite were not intended as a regular obstruction of the channel, but represented only a small mine-field for vessels that might accidentally pass over them. They were fired prematurely.

In the entrance of Guantanamo Bay the Americans found quite a number of mines. These might have caused considerable damage if they had operated, for the Americans entered the bay without any precautionary measures, and the screws of the "Marblehead" tore two of the mines loose from their anchorages so that they rose to the surface of the water. Then the whole bay was systematically searched for mines. This was done on June 21st by the boats of the "Marblehead" and "Newark." Four steam launches, under the fire of Spanish infantry hiding on the shore, fished up thirteen mines on the first day with light chains they were towing. The ships, of course, fired on the hostile position, which was soon abandoned. During the next few days thirty-five more mines were found and taken ashore. These proved to be charged with 120 lbs. of guncotton each. Many of them showed evidences of having been in contact with ships' bottoms or screws, but the firing mechanism was not capable of operating. The fuses showed such grave defects that it was quite evident that the work of constructing them had not been done under the supervision of an expert.

The mines raised in Santiago Harbour after the surrender of the place proved on the whole to be in better condition. Still, the outer row consisting of contact mines was of doubtful value. One mine was found, for instance, in which half of the guncotton had been burned, leaving no doubt that it had been in contact with some object—probably the "Merrimac"—and that the fuse had acted, but that the guncotton charge had become spoiled.

The second row of mines (electric) was in pretty good condition and might easily have destroyed one or more ships if an attempt had been made to force the entrance. These latter mines contained a charge of 200 lbs. of guncotton each. All the mines in Guantanamo as well as Santiago Bay were thickly overgrown with barnacles and seaweeds.

As a curiosity, it may be mentioned that during the Civil War lightning struck an American mine in the lower Mississippi and exploded it, and that several mines in the Potomac were exploded by lightning at a few seconds' interval without causing any disturbance in the rest of the mine system. They blew up exactly as it was intended they should be blown up in war.

IV.—BLOCKADES AND CRUISER WARFARE.

Both of these were applied by the belligerents in the mildest possible form. Spain can hardly be considered in this connection. She could do no blockading, and it is somewhat doubtful whether it was quite voluntarily that she abstained from capturing hostile merchantmen. The Americans were enabled to maintain quite an effective blockade on the coasts, which they designated as blockaded, by means of a large number of yachts and other steamers which they had incorporated into their Navy as auxiliary vessels, while their large ships were giving their attention to the hostile naval forces.

It can hardly be said that the Americans carried on systematically any destructive warfare as against Spanish merchantmen. Those they did capture almost ran into their hands, so to speak. This was especially the

case at the beginning of the war, mostly with vessels which, owing to the usual Spanish carelessness, had received no warning of the fact that hostilities were about to break out. This was even the case with the Spanish gun-boat "Callao" in the Philippines. Still a few prizes may be mentioned which were captured while making a direct attempt to run the blockade; also a few cases where vessels were chased till they ran ashore, while a few fast Spanish vessels succeeded in running the blockade. But neither the successful nor the unsuccessful attempts at running the blockade were of much importance.

A number of neutral vessels were also captured, but nearly all of them were released again, for the American Government, in adjudicating their cases, showed a liberality which was quite unheard of in former naval wars and which probably had a political background. About thirty vessels in all were considered good prizes.

As the United States as well as Spain have refrained from privateering, although they were the very countries which reserved that right at the time of the Paris Declaration, it may be assumed that privateering is definitely at an end.

During the blockade of Santiago the harbour entrance was at night kept constantly under the light of the projector of some ship designated for the duty, and boats were stationed at intervals between the other vessels and the shore, so that any attempt of the Spanish ships to go out might at once be perceived. It has been commented upon that the ship so illuminating the harbour entrance was hardly ever fired upon by the fortification works. It would seem as though telegraphically connected observation stations at the Morro and Socapa could have ascertained the exact distance of the troublesome watcher and made her work, if not entirely impossible, yet extremely difficult by firing upon her.

V.—LANDINGS.

The landing of the Americans at Daiquiri is the largest landing effected since that of the Western Powers at Balaclava in the Crimean campaign. Yet the total forces landed did not exceed 15,000 men, embarked in fifty-three steamers. It took a long time before the troops were ready to start, for everything required for an army and a landing had first to be procured. When the expedition finally did start it was found that a great deal had been overlooked or was incomplete, or had been lost in the chaos, or could not be secured. For instance, no cavalry horses—except for one troop—could be taken along because there had not been time to fit out the vessels for the reception of horses. The voyage and the landing were effected in the most beautiful weather; the Americans had good luck, as they always did. The forces were landed unmolested.

The disembarkation was effected almost entirely at a small landing bridge where but two boats could go alongside at a time. Attempts to have boats run ashore on the small sandy beach, at one end of which was the bridge, had to be abandoned after the loss of several boats, which were wrecked in the surf on the projecting rocks and stones. The report that the United States war-ships had first fired on the open strip of land

back of the landing place and routed the Spanish should not be taken literally. No such open strip of land exists there. The rocks reach close to the sea, offering hundreds of sheltered places from which the bridge might have been fired upon. Authorities in military matters state that 300 men, though they might not have been able to prevent the landing entirely, could have caused great losses. But on this occasion, as on so many others, the Spanish showed that they had no appreciation of military situations, and as soon as the bombardment commenced they retreated. They need not have paid much attention to the Cubans. The Spanish ought to have known that now that the Americans had arrived the Cubans would avoid danger even more than before.

With the landing of the army all operations on the part of the Americans ceased for a while. In spite of the most exhaustive use of all the boats and auxiliaries of the war-ships, including the armourclads guarding the entrance to Santiago Harbour, it took several days before the field guns and luggage could be brought ashore, to say nothing of the siege guns. It was found that there ought to have been many more lighters, especially such as are equipped with lifting apparatus. There was only one of these—a second one had disappeared during the voyage. There were no devices for landing horses and mules which were intended for drawing the guns. The animals were hoisted overboard, and it was taken for granted that they would swim ashore. But in a number of instances this did not happen. Many of the frightened and bewildered animals swam out to sea and were drowned. As all the boats were being used in the landing and were crowding each other for hours at the landing place, there was none available to go after the mules and lead them in the right direction. The few men in charge of landing the animals had all they could do to get those that swam ashore out of the surf and in safety. About 50 animals perished.

There was lack of management generally. No one in authority had been appointed commander of the landing place. The commander-in-chief, General Shafter, did not trouble himself about the landing. Admiral Sampson had only made arrangements as far as the war-ships and their boats were concerned. The only landing bridge was but partly covered with loose boards. No material or tools were at hand to build other bridges, and little attention was given to the one bridge in existence, as is evidenced by the fact that three weeks later the loose boards were still loose.

The conditions at Siboney, where part of the troops and supplies were landed a little later, were quite similar, except that there was no bridge at all. But in calm weather a few boats could run ashore side by side. No bridge was built here for the landing of the voluminous luggage.

The relations between the military authorities and the officers of the transport steamers had not been regulated. The latter had only their own advantage and that of the ships' owners in view, and did not pay the least attention to the wishes and plans of the officers of the troops. The greater part of the time they kept at a distance of from 8 to 20 miles from

the shore, to make sure not to go too near or to get into collision with other vessels; and if at times they did assist in unloading their cargoes, they would return to the sea as fast as possible as soon as fire was opened ashore, often taking with them the most indispensable articles of the army equipment. An American reporter even calls them insolent, un-American, mutinous cowards. The army authorities were unprepared and powerless before such conduct on the part of the officers of the transports. Under these circumstances it is not strange that the landing of the provisions, guns, and ammunition, and the entire equipment, all of which were so much needed in this locality, which offered no resources, was effected with such slowness that the troops were reduced from the outset to the meagre rations which each man carried with him; and where these had been thrown away, as had been done in many instances in order to lighten the weight, the soldiers suffered hunger.

VI.—COALING.

The late war will give a new impulse to the important question of supplying coal. Ships and fleets carrying on war in a region where they do not have available bases of supplies and coal depôts in their immediate vicinity, or whenever they are not certain that there may not be occasion for their having to leave such region temporarily, should have their own colliers with them. The colliers should have the same speed as the squadron. The ships should not be compelled to rely on rendezvous or the uncertainty of colliers sent after them. But not only should care be taken to have a sufficient supply of coal, but also to provide appliances for taking coal on board under all circumstances in the shortest possible time. The lack of such appliances has contributed not a little to the disasters of the Spanish. The coaling of Admiral Camara's ships at Port Said was nothing but a comedy. Admiral Cervera intended to coal rapidly at Santiago and proceed. But the appliances for that purpose proved so defective that the United States fleet had shut him up in the harbour before he could finish coaling, which operation took several days. At present not many ships are being built with that end in view, nor are they being equipped with appliances for coaling in the shortest possible time. This will be absolutely necessary in future, so that the ships may be enabled to take on board coal or other fuel either from a wharf or from a lighter or collier at sea.

VII.—AUXILIARY WAR-SHIPS.

What could be done with money and a practical mind in the matter of securing naval war material the Americans did when the war cloud appeared on the horizon. It is true that the purchase of foreign war-ships before the beginning of the war proved almost a failure. The United States bought the following Brazilian war-ships:—The protected cruiser "Amazonas," of 3,450 tons, afterwards called the "New Orleans"; the protected cruiser "Almirante Abreu," same size, afterwards called the "Albany," and the cruiser "Nichteroy," 7,080 tons, afterwards called the

"Buffalo," which, apart from her good rapid-fire armament, had a 38-centimetre dynamite gun; from other sources the cruiser "Diogenes," of 1,800 tons, renamed the "Topeka," and a torpedo-boat purchased in Germany, called the "Somers." The only ones of these that were assigned to the active fleet were the "Topeka" and the "New Orleans." The "Albany" and the torpedo-boat "Somers," which were still in England after the breaking out of the war, were not allowed to leave there on account of England's neutrality. The "Buffalo" did not leave the navy yard during the war. The United States had better luck with the merchant steamers they purchased and converted into auxiliary cruisers and gun-boats.

They bought 60 yachts and other steamers as auxiliary gun-boats and scouts, 4 large fast ocean steamers as auxiliary cruisers, 11 tugs, subsequently armed. The following were chartered: 4 large ocean steamers as auxiliary cruisers. Placed in commission: 14 revenue cutters as auxiliary gun-boats and scouts. In all, 93 steamers for warlike actions, more or less armed and fitted out for that purpose.

There were also purchased as adjuncts of the fleet 20 transport-vessels, 9 colliers, 1 repairing-ship, 2 water-distilling ships, 2 ice-manufacturing ships, 3 hospital-ships; in all, 37. This does not include the temporarily chartered steamers for the larger troop transports.

The large auxiliary cruisers were also occasionally utilised for the rapid transportation of troops. The auxiliary gun-boats were indispensable for the blockade of the extensive stretch of the coast. The names of several of these, even of tugs, were specially mentioned in several of the battles. A few of the auxiliary vessels, as, for instance, the "St. Louis" and the "Zafiro," were equipped with special devices for dragging for cables, which they used with good success.

As for the adjuncts of the fleet, the distilling-ships were intended especially to furnish fresh water to the blockading auxiliary vessels and the transports of the landing army: As most of these vessels had inadequate distilling apparatus, some of them none at all, this was necessary, so that they might not be compelled to leave the blockade for the purpose of renewing their water supply. The repairing-ship "Vulcan" was also equipped with a powerful distilling apparatus.

The ice-manufacturing ships supplied the vessels not equipped with ice machines, also the hospitals of the invading army of Cuba. The object of the other adjuncts of the fleet is self-evident.

The repairing-ship "Vulcan" has proved extremely useful even indispensable for the blockading fleet at Santiago. She supplied 31 vessels with extra engine parts, material, and tools. Twenty-six vessels were repaired, and a number of repairs were also made on guns and their equipments. The "Vulcan" also rendered important services in connection with the raising of the "Maria Teresa."

How important it is to own transports specially fitted out for the transportation of troops and war material was demonstrated in this war, though principally by the lack of vessels equipped for such service. Of the transports purchased during the war, the Navy Department has

retained 16, which are to be refitted for service as regular marine transports, namely, the "Panama," "Port Victor," "Rita," "Mohawk," "Mobue," "Massachusetts," "Manitoba," "Minnewaska," "Mississippi," "Michigan," "Roumania," "Obdam," "Berlin," "Chester," and "Britannia," employed on the Atlantic Ocean, and one on the Pacific coast. During the war they were used not only for the transportation of troops, but also for supplying provisions and material.

It would have been very desirable to have had even more of these. The blockading fleet, for instance, complained of the very defective mail service, as also of the fact that, although it was comparatively but a short distance to the United States ports, so few fresh provisions were received, which circumstance impaired the health of the troops.

Vessels built for special purposes are in times of peace, at manœuvres, stepchildren of the Navy; they are considered expensive and troublesome adjuncts which have to be taken into consideration in manœuvres and impede their rapid execution; and yet how useful they are and how much relief they are able to furnish in actual war! Whenever mobilisations show that there is not a sufficient number of suitable merchant steamers which would be unquestionably at the disposal of the Navy at the beginning of a war, provision should be made to have vessels set apart which can be easily equipped for such purposes, and, if necessary, to own and keep in constant readiness a number of such special vessels even in time of peace.