

A COMBINATION ANCHOR.

So little real development has been made in anchors during the past few decades, that considerable interest attaches to the Hall combination anchor, the most important feature of which is the combination of a fluke anchor and a mushroom anchor. From the records of the Patent Office there appears never to have been a serious effort to accomplish this. The accompanying engraving of the anchor shows that it meets the most exacting demands of both of the former types.

It is a well-known fact, proved by years of universal experience, that for anchoring vessels where the bottom or holding ground is mud or very soft sand, the mushroom type of anchor excels any sort of fluke anchor. It is equally well known that, in bottoms of hard sand, rocks, or other hard material, the anchor with sharp prongs or flukes holds best. Theoretically, then, a vessel's safety would require that it be equipped with both types of anchor. But the mushroom is unwieldy in the extreme, difficult to stow aboard ship, and has therefore been universally discarded for portable use. It is, however, in general use as a permanent mooring. And as a properly made fluke anchor, either with one or two flukes, holds to some extent in soft bottoms, upon it has depended the safety of the vessel, regardless of the character of the bottom into which it is placed. Yet it is acknowledged to be eminently not adapted to hold in soft bottom. And even if a vessel were equipped with both types of anchor, the bottoms for which each is adapted merge into each other, through various degrees of hardness and softness, in which neither one could be depended upon for a secure hold. When the anchor is lowered and strikes the bottom, it falls so that the elliptical head rests on one of its broad sides, and the fluke on that side drops down of its own weight and drives its point into the bottom. As the mushroom is an elongated ellipse, it must always rest on one of its sides, and thus keep the plane of the flukes at right angles to the surface of the bottom, i. e., one fluke or the other must always engage the ground.

When the vessel's weight pulls the anchor forward, the fluke is driven deeper into the bottom until it reaches its maximum angle of 55 degrees with the shank, during which time the entire weight of the anchor, being concentrated at the mushroom end of the shank, drives it deeper. The edges of the mushroom are sharp, and the head itself is of such shape as to maintain the greatest possible hold on the bottom for each inch of penetration. Thus in soft bottoms the mushroom sustains an effective hold, which is augmented by the deeper hold of the fluke; while in bottoms too hard for the mushroom to penetrate, the fluke sustains a strong hold, which increases with the pull of the vessel, owing to its carefully studied shape and angle of penetration.

It has been proved, after exhaustive tests, that this type of anchor will hold more pounds of strain per pound weight of anchor than any simple type of anchor in any bottom.

THE ITINERARY OF THE CRUISE.

The composition of the United States Atlantic fleet and the second torpedo flotilla, on

their voyage from Hampton Roads to San Francisco, was as follows: The first division, under Rear Admiral R. D. Evans, commander in chief of the fleet, consisted of the four sister ships "Connecticut," "Kansas," "Vermont," and "Louisiana." The second division, Rear Admiral W. H. Emory commanding, consisted of the sister ships "Georgia," "New Jersey," "Rhode Island," and "Virginia." In the third division, under the command of Rear Admiral C. M. Thomas, were the "Minnesota," one of the "Connecticut class," and the sister ships "Ohio," "Missouri," and "Maine." In the fourth division, commanded by Rear Admiral C. S. Sperry, were the sister ships "Alabama" and "Illinois" and the sister ships "Kearsarge" and "Kentucky." Accompanying the fleet were four auxiliaries,

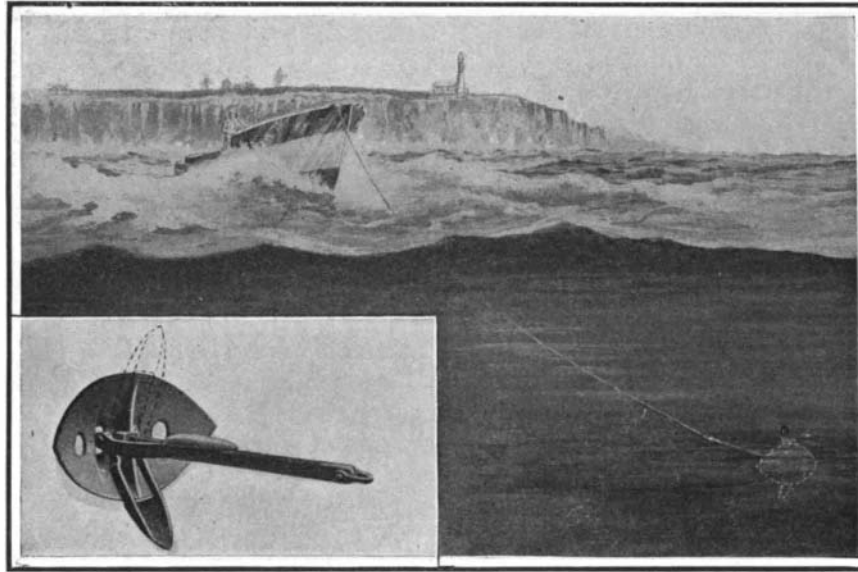
Magdalena Bay, where it arrived on March 12th. Here, after a stay of one month, during which the fleet indulged in extensive target practice, the ships weighed anchor for the last leg of the course to San Francisco, 1,017 miles in length, and arrived in San Francisco Bay on May 6th, having covered a total distance of 14,441 miles since leaving Hampton Roads.

The torpedo flotilla followed the same general route, in shorter stages, making twelve calls between Hampton Roads and San Francisco, where it was timed to arrive on the same day as the battleship fleet.

Prior to leaving San Francisco, the Atlantic fleet was changed by the detachment of the second torpedo flotilla and the "Arethusa," and the substitution of the "Nebraska" and "Wisconsin" for the "Alabama" and "Maine," the two latter preceding the fleet to the United States via the Suez Canal. The fleet left San Francisco on July 7th, and after covering 2,100 miles reached Honolulu on July 16th, whence it sailed on July 22nd for the longest voyage of the whole cruise of 3,850 miles to Auckland, New Zealand, at which port it arrived on August 9th. Leaving Auckland after six days stay, the 1,284 miles to Sydney, Australia, were covered by August 20th; and after a stay of eight days the fleet sailed on August 28th on the shortest leg of the cruise, 575 miles, to Melbourne, Australia, which was reached on August 29th. Sailing again on September 5th, the fleet steamed to the westward for 1,350 miles to Albany, Australia, whence, after coaling, it sailed on September 18th for the Philippines, another long leg of 3,300 miles. The Philippines were reached on October 2nd, and on October 10th, a start was made for Yokohama, Japan, 1,750 miles distant, at which port the ships arrived

October 17th. Here the fleet was divided, and on November 4th it set sail again for Manila, the second squadron going by way of Amoy, China. The first squadron reached Manila on October 31st, and the second squadron on November 7th. The total distance covered from San Francisco to Manila was 16,218 miles.

On December 1st, 1908, the fleet sailed for Colombo, Ceylon, 2,946 miles distant, which was reached December 14th, 1908; and on the 20th, it started upon another long leg of 3,440 miles to Suez, which was reached January 5th, 1909. With a view to visiting as many of the principal ports of the Mediterranean as possible, the ships scattered at Port Said, and Messina, Naples, Villefranche, Marseilles, Beirut, Smyrna, Malta, Tripoli, Athens, Salonica, and Algiers were visited; the fleet finally assembling at Gibraltar for the 3,200-mile voyage across the Atlantic Ocean to Hampton Roads.



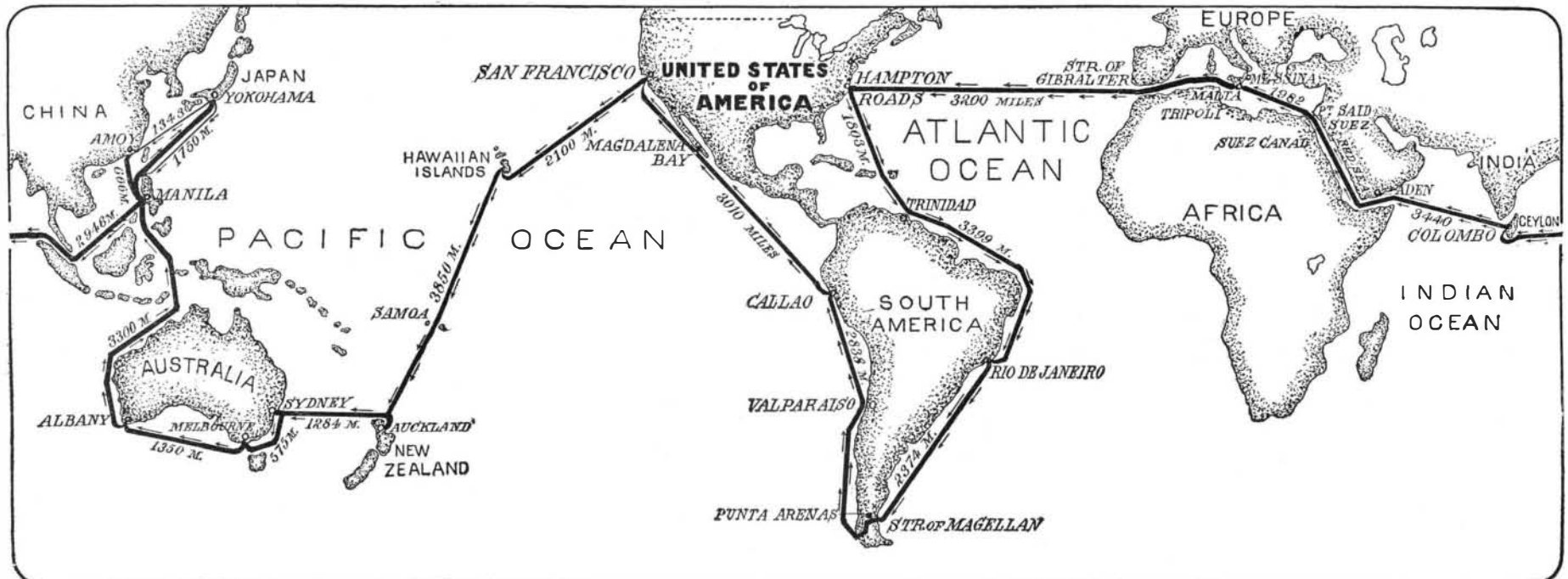
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the "Culgoa," "Glacier," "Panther," and "Yankton." In the torpedo flotilla were the destroyers "Whipple," "Truxtun," "Lawrence," "Stewart," "Hopkins," "Hull," and the storeship "Arethusa." Leaving Hampton Roads on December 16th, 1907, the fleet steamed to Trinidad, at which port it arrived December 23rd, after covering a distance of 1,803 miles. The next leg, one of the longest on the cruise, was from Trinidad to Rio Janeiro, a distance of 3,399 miles, the fleet leaving on December 29th, 1907, and reaching Rio January 12th, 1908. After a stay of nine days, a start was made on January 21st for Punta Arenas, 2,374 miles distant, which was reached February 1st, 1908. After navigating the Straits of Magellan in safety, the fleet entered the Pacific and turned north for the port of Callao, Peru, which it reached without incident after covering 2,838 miles. Callao was left on February 29th, and a stretch of 3,010 miles carried the fleet to



MAP OF THE MEDITERRANEAN, SHOWING THE PORTS VISITED BY THE VARIOUS SHIPS AFTER THEY SCATTERED AT PORT SAID.

From a discussion on the subject before the Illuminating Engineers' Society it is noted that daylight commonly runs as low as one-tenth, or even one-hundredth of a candlepower to the square inch. Although it has been claimed that the injurious effects of artificial light were due to the ultra-violet contained therein, it was here pointed out that there is less ultra-violet light in the rays of various incandescent illuminants than there is in direct or reflected sunlight, so that the injurious effects of the artificial means are traced to the greater intrinsic brightness.



MAP SHOWING THE COURSE OF THE ATLANTIC FLEET ON ITS VOYAGE OF 42,000 MILES AROUND THE WORLD.