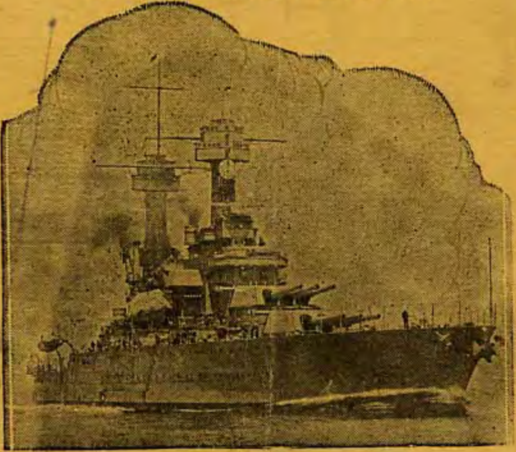
THE GRIZZLY BEAR

Souvenir Edition

U. S. S. CALIFORNIA



"The Pride of the Navy"

JULY - AUGUST
1 9 2 1

AT PRESENT

UNITED STATES NAVY YARD

MARE ISLAND CALIFORNIA

BUILT in the only navy yard in California, built by Californians, christened the California and now manned by Californians, the great battleship of that name will shortly take its place in the Pacific Fleet as the latest word in warship construction and will promptly be designated flagship of the fleet that guards California and the west coast.

In competition with navy yards on the Atlantic coast, Mare Island submitted estimates on the construction of the giant vessel. Mare Island's estimates were lowest and Secretary of the Navy Josephus Daniels awarded the job to the California yard, although battleship building was something new on the west coast.

Despite the handicaps of transportation of building material from the east coast and the necessity of awaiting plans from the eastern yard constructing the sister ship of the "44," which was the original designation of the present California, the Mare Island yard succeeded in laying the keel of the ship on October 25, 1916 and shortly afterwards had a large force of men at work.

Until April, 1917 work on the California progressed rapidly, but on the declaration of war in that month, the job was practically abandoned so the navy yard mechanics might center their efforts on the construction of smaller vessels needed more urgently.

When the Armistice ended the strain under which the yard was operating, production rapidly returned to normal and work on the big battleship was resumed.

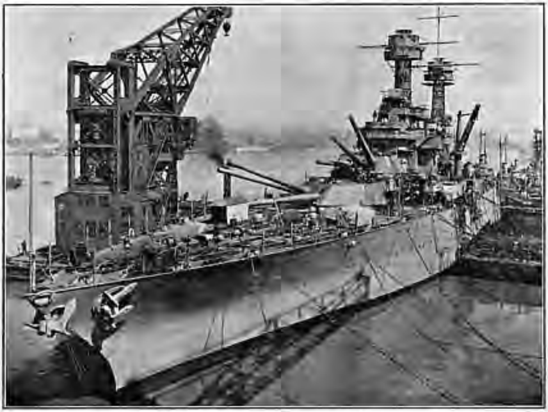
On November 20, 1919 the mightly vessel was launched. Mrs. Barbara Stephens Zane, daughter of Governor William Stephens, acted as sponsor. From the launching to the present date the vessel has been lying alongside the quay wall fitting out, with the exception of a short time she was in dock at San Francisco having the launching gear removed from the bottom.

The California represents the very latest type marine construction. Electricity is to be used every place aboard the ship where power is needed. The four large propellers will be driven by 26,800 horsepower electric engines, forcing the ship through the water at a speed of 21 knots an hour. In addition to the main drive, electricity will be used for lighting, ventilation, steering, hoisting anchors, boat handling and in the operation of laundry machines, dish washers, meat choppers, ice cream freezers, potato peeling and many auxiliaries. The heavy turrets will be turned by electricity and the fire control system is completely electrical.

Electricity for such general use in a fighting ship was not accepted until the collier Jupiter was constructed at Mare Island several years ago and electric engines were installed. Sister ships were built, one using geared steam turbine drive and the other direct connected reciprocating engines. Results showed the unquestioned superiority of electric drive and produced an actual fuel saving of about 25 per cent. The machinery is far simpler than other type propulsion and there is less danger of it being put out of commission by torpedoes or shell explosion.

The battleship Tennessee, recently commissioned on the Atlantic coast and ordered to duty in the Pacific, as the sister ship of the California, is the only other vessel in the American navy equipped with electricity so thoroughly, but the California has several improvements not installed on the Tennessee, as the result of lessons learned during the war in the operation of major ships.

WHEN the U. S. S. CALIFORNIA goes into commission on the 15th of August she will take the place as the flagship of the reorganized Pacific Fleet. The new fleet as rearranged will be made up as follows: Flagship, California; Maryland, New Mexico, Idaho, Tennessee, Mississippi, Arizona, Oklahoma and Nevada.



THE SHIP IN FIGURES

Length between perpendiculars, 600 ft.
Length over all, 624 ft.
Breadth, maximum, 97 ft, 5¾ in.
Depth (to main deck), 47 ft., 2 in.
Mean draft at trial, 30 ft., 3 in.
Trial displacement, 32,300 tons.
Contract speed (12 hrs.), 21 knots.
Fuel capacity (normal), 1900 tons.

MACHINERY

Shaft horsepower, 26,800.
Shafts (propellers), 4.
Revolutions per minute, 175.
Boilers, water tube, 9.

ARMAMENT

Twelve 14-in., 50-caliber rifles, mounted three in each of the four turrets.
Fourteen 5-in. rapid fire guns.
Four saluting 6-pounders.
Four 3-in. anti-aircraft guns.
One 3-in. landing gun.
Two 30-cal. machine guns.
Two 1-pounder boat guns.
Four 21-in. submerged torpedo tubes.

COMPLEMENT

15 Staff Officers.
57 Commissioned Officers.
1400 Enlisted Men (sailors).
75 Enlisted Men (marines).

WHEN Captain Milton E. Reed, U. S. N., came to Mare Island in February 1918, he brought with him 18 years' service that qualified him to assume charge of the important Machinery Division at the navy yard and not only continue to guide the division on its successful course, but to make a number of important changes in the scope of the division's work and to continually endeavor to procure new work for the navy yard.


Captain Milton E. Reed

Captain Reed took over the Machinery Division work on the California in addition to the other duties at the yard and has won a round of praise from officers of the Pacific Fleet who have examined the big craft. He obtained the confidence of the Bureau of Engineering when he made good on several important jobs given his division and there is seldom any questioning now of statements made by him to the department. If Captain Reed says a job can be accomplished in a certain time or at a certain cost, the department accepts his figures. If Captain Reed recommends certain changes in a plan and gives his reasons for recommending the change, his word is accepted.

The head of the Mare Island division is nationally known as an engineer. When the government needed an officer to establish a post graduate course of engineering at Annapolis, Captain Reed was selected to organize the course. His work was so well done that very few changes have been made to this day.

Since he was assigned to Mare Island, new work has been featured. His division outbid other yards for the establishment of a factory for the construction of gas engine spare parts. The figures were so low that officers in Washington expressed surprise. Mare Island now has a destroyer propeller station equal to any in the United States. Straightening machines and other equipment have been added to the facilities here and all vessels of this type on the Pacific Coast are now being cared for at this navy yard. Mare Island has become the evaporator coil factory for the west coast since the advent of Captain Reed and the optical school has also been added. Extensions have been made to the machine shops to care for the extra work and much additional equipment has been obtained from the Risdon, Providence and Buffalo shipyards, yards that were established during the war by the government.

One item that Captain Reed believes is important is the continuation of his working force at a permanent figure. When the armistice was declared it was found that considerable work was stopped and that it would be impossible to carry the large number of mechanics. Through his ability to get new work for the yard, the force now is as large as at the time of the armistice, while other yards have fallen off in strength. Puget Sound itself lost over 700 men.

Captain Reed takes considerable pride in his work aboard the California, especially as his department was called on to install the modern electric plant. He has never tired in his efforts to have all engineering work on the big battleship in "ship-shape" and when the commanding officer reports back from the trial trip that all the machinery is in first class order, he will have Captain Reed to thank for that.

FEW officers in the naval service have had a more interesting or varied career than Captain Edward L. Beach, Commandant of Mare Island Navy Yard. Few have been successful in as many fields and few, having reached rank and authority, have remained more thoroughly "human."

Graduating from the naval academy in 1888 Captain Beach entered the engineer corps of the navy. He knows the difference between a gate valve and a cape chisel; and was one of the most active younger engineers at a time when the engineer corps was an admirably trained and efficient body. In those early days he bore the reputation of being a worker not afraid of either steam or grease—also of knowing a man under him and of inspiring confidence and desire to work.

Captain Edward L. Beach

He served on the old monitor Puritan, with engine room temperature up to 150 degrees, and fire room blazing up to 175 degrees when her old engines seemed ready to pull loose from their bed plates at short notice. Day after day he wrestled with them and finally with others got the Monitor in running order for the Spanish War. By great luck he left this monitor for an Asiatic Station only a few months before Dewey left Hong Kong to find the Spanish Fleet. He was on one of Dewey's ships on the famous May morning in Manila Bay and later cruised up and down the Philippine Archipelago during the insurrection.

About this time—1889—the Personnel Act was passed transferring most of the old engineers to the line. Captain Beach was one of those qualified and since that year has divided his sea duty between engine room and deck. He is thoroughly at home in navy yards having served as assistant engineer officer at Cavite, as engineer officer of the Boston Navy Yard, commanding officer of the repair ship Vestal—which he fitted out—and as Commandant of the Naval Torpedo Station. Probably no other officer of the navy knows more yard foremen, leadingmen and workmen or more methods and working of naval stations. Captain Beach has also served at the U. S. Naval Academy where he was first an instructor in the department of English and Law and later head of the department of modern languages. He speaks both Spanish and French.

Captain Beach wears not only service medals for the Spanish and Philippine campaigns but also for the Mexican campaign, during which he commanded the Vestal. He was in Haiti during troublous waters there and was lucky enough to be in command of the dreadnought New York, Admiral Rodman's flagship at the surrender of the German fleet. He thus had an excellent view of one of the greatest events in naval history and helped entertain royalty on that occasion. During its war zone services the New York, like our other battleships, was exposed to grave dangers. On one occasion Captain Beach standing on the bridge felt the starboard propeller strike a submarine and soon after saw a torpedo from another submarine cross the bow close aboard, followed by two others that passed astern.

In 1916 Captain Beach had another thrilling experience. While his armored cruiser, the Memphis, was lying in the harbor of Port Au Prince, Haiti, she was suddenly lifted by a tidal wave and hurled on the reefs. For a time it looked as if the ship would break up and all would be lost, but thanks to good seamanship nearly all the crew were saved. The vessel was a total loss.

An interesting part of Captain Beach's variegated life has been his diplomatic career. On the Memphis he took Secretary McAdoo cruising around South America; and later he was sent to Haiti as a special representative of the Secretary to negotiate a difficult treaty. Though the case seemed almost hopeless, with a big majority of the legislature against the treaty, Captain Beach through the warm friendship of the President and his persuasive powers with other officials finally prevailed and has the satisfaction of seeing the treaty signed and ratified—a notable triumph very pleasing to the administration.

While on duty at the Naval Academy Captain Beach was editor of the Naval Monthly "The Proceedings of the Naval Institute." This led to an acquaintance with publishers who urged him to write books for boys with the result that he has written two highly successful series of juvenile books.

WHEN Henry M. Gleason, Captain U. S. N., resigned his commission in the navy on September 23, 1920, to accept a position with a private shipbuilding firm, Mare Island lost its nationally famous shipbuilder, the man who made it possible for Mare Island to land the coveted task of building a giant 32,000-ton dreadnought of the most modern design where previously tankers had been the largest type vessel entrusted to Mare Island.

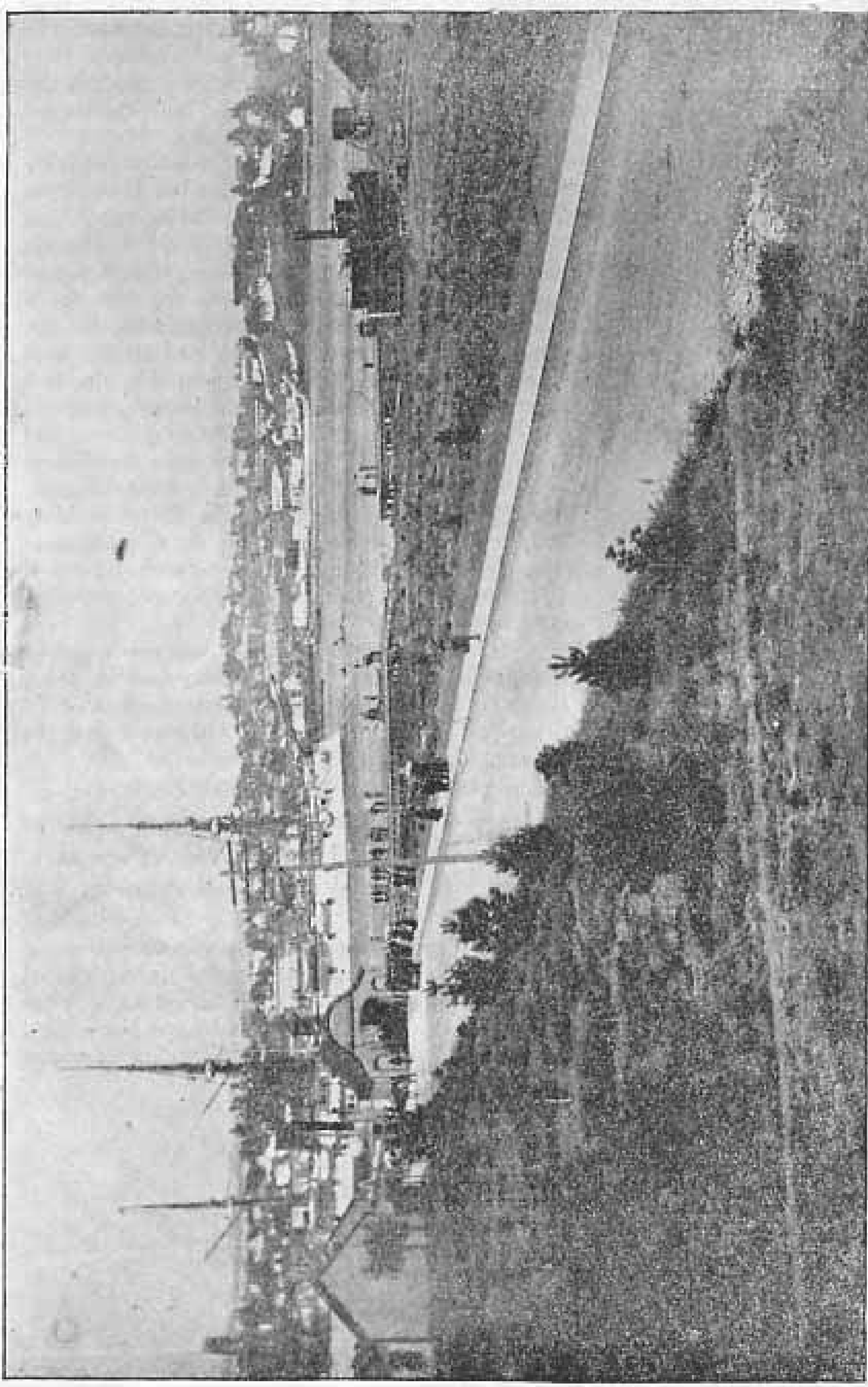
Captain Henry M. Gleason

Were it not for the wonderful record made by Captain Gleason as head of the Hull Division at Mare Island from December 1, 1910, until last September, it is very doubtful if the California would have been constructed here. Mare Island had to enter into competition with the other navy yards and with private shipbuilding firms for the construction of this vessel. The long freight haul across the continent had to be figured in the cost of construction and many costly improvements to the building ways and to the cantilever crane had to be included, but in spite of these handicaps, Gleason knew his men and his men knew Gleason, and he underbid all yards for the job of building the dreadnought. He had built up a machine at Mare Island that he could trust and when he staked his reputation on a job he knew his men were behind him.

Ten years ago Captain Gleason was assigned to Mare Island as construction officer and in those ten years he has supervised the construction of 22 vessels, six of them large craft, including the dreadnought California and the preliminary work of the dreadnought Montana.

On almost every vessel constructed at Mare Island under his supervision the government has been saved many thousands of dollars and it is estimated by his friends that he has saved the government millions of dollars on new work.

Before graduation he saw service in 1898 in the Spanish-American War on the U. S. S. Marblehead off the coast of Cuba. A year later he was graduated number six in his class and was assigned to a post graduate course in naval architecture and marine engineering, which he completed at the universities of Glasgow and the Royal Technical University of Berlin. On his return in 1901 Captain Gleason served in the construction corps at the Philadelphia Navy Yard and as superintending constructor at the Neafie and Levy Shipbuilding Company at Philadelphia.



THE photograph on the left shows the main gate of the navy yard as it appeared in the early 80's up to 1900, when the change was made to the present Building 123. The Marine Guard at the gate used to ring the time of day or night every half hour—shops bells—from the old gate house. This picture was taken about 1880. The officers and their wives in this picture are awaiting the arrival of officers from a French man-o'war which has just made fast to one of the buoys in the stream.

At the bow of the ship can be seen the captain and officers from the ship coming ashore in a small boat. The ship was docked in Dry Dock No. 1 and repaired by the yard force. This gate house was used by the marine guard while on duty in policing the yard, the same as at present. While off duty they occupied the wooden building to the left. Each guard was relieved every morning at 9 a. m. from the Marine Barracks. Their meals were brought to them from the barracks with the ordinary horse drawn bread wagons.

The Telephone Exchange was also located at this gate house, the exact number of exchanges can hardly be remembered at this time, but am sure it did not exceed over 20 numbers. The Commandant's office and all the heads of departments, light house, hospital and barracks and magazine, composed the exchange. The only operator was N. P. Hoffman, who many can remember to this day. George E. Hanscom was in charge of the telephone system at that time as well as the few exchanges in Napa, Vallejo and Solano County.

The small tug at the right was either the Lively or Nellie, which transported the officers and families back and forth from Vallejo to Mare Island. These small tugs were drawn up on the ways by the ordinary capstan principle for repairs.

A few of the officers in command at this time were Commodore J. H. Russell, Commandant; P. C. Johnson, Captain, U. S. N., Captain of the Yard; C. C. Wolcott, Civil Engineer of Yards and Docks; Jos. Foster, Naval Constructor; and Mr. Fletcher, Steam Engineering Department.

The new gate house and the present one, was erected about 1900, and a separate Labor Board building was built on the site of the wooden guard house shown on the left, and a short way this side was erected a Medical Dispensary. On the end of the Dispensary building a new fire engine house was constructed and remained in operation as originally built for several years.

The location of the present ship building ways, which our pride, the California, was launched but a short time ago, brought about great changes in this vicinity, to-wit: Labor Board building had to be moved twice before it finally landed secure as Courts and Boards building—present place.

The Medical Dispensary also had to be moved twice before it finally rested where it is, Bldg. 125—all to make way for improvement. The fire engine house also had to make a short trip across the street to where it now stands—at present time Bldg. No. 99A. Bldg. 45, the old brick sail loft, also had to make way for improvements by losing about 75 feet off its eastern end to make way for the greater lengths of the California and Montana.

Let us hope that greater improvements will take place at the lower end of the navy yard, when the Ammunition Depot will have to give way for our new Naval Base facilities which, at the present time looks assured.

—*Old Timer.*

A victim of the World War—the U. S. S. San Diego—formerly the U. S. S. California. Built at the Union Iron Works in San Francisco she was named the U. S. S. California. When the present battleship bearing the name of this state was commenced her named was changed to the U. S. S. San Diego and was sunk by a mine on the Atlantic Coast during the World War.

SOUVENIR PROGRAM
LAUNCHING OF THE

U. S. S. California

NOVEMBER 20, 1919.
NAVY YARD, MARE ISLAND, CAL.

Captain E. L. Beach, Commandant of Mare Island Navy Yard.

FEW OFFICERS in the naval service have had a more interesting and varied career than Captain Edward L. Beach, Commandant, Navy Yard and Station, Mare Island, California. Few have been successful in as many fields; and few, having reached rank and authority, have remained more thoroughly "human." He is known and admired on many stations.

Graduating from the Naval Academy in 1883 Captain Beach entered the Engineer Corps of the Navy. He knows the difference between a gate valve and a cape chisel; and was one of the most active of the younger engineers at a time when the old Engineer Corps of the Navy was an admirably trained and efficient body. In those early days he bore the reputation of being a worker not afraid of either steam or grease — also of knowing the man under him and of inspiring confidence and desire to work. He served on the old monitor Puritan with engine room temperatures up to 150 degrees, and fire room blazing at 175 degrees (the heat of a Turkish bath), when her old engines seemed ready to pull loose from their bed plate at short notice. Day after day he wrestled with them and finally, with others, got the King Monitor in running order for the Spanish War. By great good luck he left this monitor for an Asiatic station only a few months before Dewey left Hong Kong to find the Spanish fleet. He was on one of Dewey's ships on the famous May morning in Manila Bay, and later cruised up and down the Philippine Archipelago during the insurrection. About this time, 1899, the Personnel Act was passed, transferring most of the old engineers to the line. Captain Beach was one of those who qualified, and since that year has divided his sea duty between engine room and deck. He is thoroughly at home in Navy Yards, having served as Assistant Engineer Officer at Cavite; as Engineer Officer of the Boston Navy Yard; as Commanding Officer of the repair ship Vestal (which he fitted out); and as Commandant of the Naval Torpedo Station. Probably no other officer of the Navy knows more yard foremen, leadingmen, and workmen, or more about methods and workings of naval stations. Captain Beach has also served at the U. S. Naval Academy, where he was first an instructor in the department of English and Law, and later head of the department of Modern Languages. He speaks both French and Spanish.

Captain Beach wears not only service medals for the Spanish War and Philippine insurrection, but also for the Mexican campaign, during which he commanded the Vestal. He was in Haiti during the troublous times there, and was lucky enough to be in command of the dreadnaught New York, Admiral Rodman's flagship, at the surrender of the German fleet. He thus had an excellent view of one of the greatest events in naval history, and helped in feting royalty on that occasion. During its War Zone service the New York, like our other battleships, was exposed to grave dangers. On one occasion Captain Beach, standing on the bridge, felt the starboard propeller strike a submarine, and soon after saw a torpedo from another submarine cross the bow close aboard, followed by two others that passed astern.

In 1916 Captain Beach had another thrilling experience. While his armored cruiser, the Memphis, was lying in the harbor of Port au Prince, Haiti, she was suddenly lifted by a tidal wave and hurled on the reefs. For a time it looked as if the ship would break up, and all would be lost; but thanks to good seamanship nearly all the crew were saved. The vessel was a total loss.

An interesting part of Captain Beach's variegated life has been his diplomatic career. On the Memphis he took Secretary McAdoo cruising around South America; and later he was sent to Haiti as a special representative of the Secretary, to negotiate a difficult treaty. Though the case seemed almost hopeless, with a big majority of the Legislature against the treaty, Captain Beach through the warm friendship of the President and his persuasive power with other officials, finally prevailed, and had the satisfaction of seeing the treaty signed and ratified—a notable triumph very pleasing to the administration.

While on duty at the Naval Academy, Captain Beach was editor in chief of the Naval monthly, "The Proceedings of the Naval Intitute." This led to an acquaintance with publishers who urged him to write a Naval Academy book for boys—with the result that he has written two highly successful series of juvenile books, the second dealing with the life of a young naval officer afloat. The Commandant is thus known to the younger gererations of almost every library town in the country; and many oldsters have also enjoyed his books. There are few better Navy yarns than "Ralph Osborne on a Torpedo Boat Destroyer" —which incidentally carries the hero to Haiti, a favorite isle with the author. He may be fairly classed with that delightful British naval writer, Captain Marryat. Captain Beach has also written several technical essays.

This sketch would be incomplete without a reference, complimentary but not flattering, to the personality of our Commanding Officer. He has friends of every race and in every walk of life, and has been as successful with Chinamen and Filipinos, or with negroes in Haiti, as with our own people. He is a good listener, and is always ready to hear what a sensible man under him has to say. Successful as he has been with mechanical things, he has been still more successful with people.

PACIFIC COAST'S EARLIEST NAVAL BASE ESTABLISHED AT MARE ISLAND IN 1854 BY ADMIRAL DAVID G. FARRAGUT.

THE SMOKE from the guns had cleared; a faint echo, barely discernible, came back from across the waters; the bleak winds that swoop across San Pablo Bay sang their dreary, "Ooom, Ooom, Ooom," through the trees and my lifelong friend was laid to rest on the slope of a lonely hill; a hero to the cause.

Long after the procession had gone I stood above his grave and thought. Thought of the wonderful days of the past; the emptiness of the present.

How long I stood, I do not know.

But when I turned to go back to the camp, I looked out beyond the road to where thousands of men were working and hurrying through the streets. Steam and smoke filled the atmosphere above, and the noise of clanging steel made me think that there, amid all that din and strife, I might forget.

I crossed over; passed the sentry; entered the yards, and had hardly gone fifty feet before I was lost in the tangle of steel and men that met my gaze at every turn.

Monstrous cranes reached down, picked up fifty thousand pounds of steel as easily as I might an ounce, swung it into place and held it, while a hundred men, like hungry ants, pounced upon it and drilled and drove it fast.

Mighty hammers were pounding into shape, pieces of steel that seemed large enough to sink an ordinary ship.

The huge pumps were emptying the dry-docks at a hundred and fifty thousand gallons a minute, and the keel of the ship that had entered, had hardly come to rest before an army of workmen swarmed aboard to repair, while as many others swung over the sides to scrape and paint.

In a shop across the road, men were shoving out the smaller craft almost as fast as one could think. I tried to stand and watch, but hurrying men, each bent upon some special duty, unconsciously shoved me on. They had no time to go around.

So on I moved. And there, in all her mightiness, on the very spot where the old Mohekin lay for twenty years, stood the monstrous hull of the CALIFORNIA. I stood and gazed, openmouthed, at the men crawling in and out of her still open sides, like bees in a hive.

Someone who evidently had read my bewildered expression, explained that she would be 32,000 tons; 624 feet long, with a beam of 97.8 feet and would make 20.5 knots per hour. I thought of the old Mohekin that was launched in 1886. Almost twenty years before she left the ways, and today on the same spot they are building the world's largest super-Dreadnaught, now about 70 per cent completed upon this, the day of her launching, November 20, 1919. My thoughts turned to the flight of time and what would have been the consternation had this monster steamed with Admiral Farragut up Mobile Bay or with Dewey into Manila Bay.

Beside her they were building destroyers and the white hot rivets that men were throwing, brought back the memories of that freakish shower of stars in 1898.

Engines darted here and there; men ran and whistles blew, all eager to complete another ship and make the American Navy a bigger and better fighting unit, a fitting tribute to the nation it represents.

A new ship slid into the sea and had hardly cleared the ways before the keel of another was laid. Before I left, the cranes had swung half it's ribs into place and men were eager to make another record. Swift little patrol boats darted from every corner and passed and repassed, guarding the long line of docks.

Dumfounded by this seething mass of steel and steam and men, I knew not which way to turn. No wonder they build these sleek sided destroyers in seventeen days.

Buffeted by the hurrying throngs, I found myself dodging and running and ducking, until at last my zig-zag course led me out into the open again. I stopped in a little park to rest, on what seemed but a twisted piece of steel.

When I regained myself I thought, by the numerous other scattered pieces how foolish it was to spoil this spot by using it for a junk heap. But I want to retract that thought, for I found each one to be a relic of some dead conquerer of the sea.

This twisted mass of steel upon which I had rested was the propellor of the U. S. S. Nipsic, which was wrecked at Apia, Samoa, in a hurricane on March 16, 1886.

Beside it stood the bow ornament of the old Independence, built in 1814, and sent to Mare Island in 1855 for the purpose of testing a new sectional dock. For years, the Independence was used as a receiving ship at this station and on October 30th, 1886, was the first ship to enter the yard's present dry dock Number One. A few years ago, she was hauled to the Union Iron Works and burned for the salvage metal her hull contained.

A few feet away stood the Skeg and piece of the rudder-post of the Hartford, Admiral Farragut's Flag Ship. On either side were guns used in Farragut's battle on the Mississippi, and at Mobile Bay.

Then, there were two guns, of the type used by Commodore Sloat, in the occupation of California, cast in 1826 and brought to the Pacific coast on the Independence.

An anchor, lost by the British ship "Centurion," in 1742 at Juan Fernandez Island, (Robinson Crusoe's Island), during Lord Anson's voyage around the world, bespoke the cruise of the U. S. S. Lackawanna, whose crew recovered it in May, 1882.

Two iron guns taken from the schooner "Chapman," seized in the early sixties while fitting out for a piratical cruise, told of the coming of law and order to the Pacific.

On a lofty pedestal, the figurehead of the U. S. S. Corvette, Kearsarge, which sank the Confederate Cruiser Alabama off Cherbourge, France, on June 14, 1864, stood like a silent sentinel guarding the two eleven inch guns that fired the fatal shots.

Two 4.7 inch bronze muzzle-loading rifles from Fort San Feline, Cavite, P. I. surrendered to the U. S. Naval force, brought back the memories of Commodore George Dewey's fearless battles. A section of the mast of the U. S. S. Boston, struck by a 4.7 inch shell and two Whitehead torpedoes, captured with Isla De Luzon on May 1, 1898, told of his exploits in Manila Bay.

So I sat and mused for an hour or more, on the stories those name plates told. Suddenly I saw a man walking up the street with a skeleton. Was I crazy? Had all the bigness of this place carried away my reason? Surely I was dreaming.

Then I saw another; and still another. I must follow and see. Thanks to these legs that carried me, I found that in excavating for the new roads on Mare Island, the workmen had unearthed an ancient Indian burial ground.

As I turned and came away, I passed a little house, and on a plate above the door, the inscription read:

THESE QUARTERS WERE
OCCUPIED
BY
ADMIRAL (THEN COMMANDER)
D. G. FARRAGUT
FIRST COMMANDANT
U. S. NAVY YARD
MARE ISLAND
1854-1858

Enough—for one day. I must return to camp. But there to interest me still more, were thousands of men with their white uniforms glistening in the sun, as they drilled.

I watched them move, and like a single man, they crossed and recrossed the grounds. Up; back; down; across and around they marched.

That night I could not sleep. My hammock brought thoughts of a typhoon as my restlessness made it rock. Where could I begin, how could

I hope to tell half the stories that Mare Island holds?

Not only should Mare Island be held in the minds of men for the history she has made, or for what she shall make in the future, but for the noble and romantic lineage of those brave settlers who pioneered in the early history of California, conquering the Indians by kindness and diplomacy, instead of force and blood, and giving to the world an earthly Paradise.

In tracing this back, I learned that over the river still lived one of this romantic lineage. Dr. Vallejo. I sought his acquaintance and asked him to narrate his memoirs of the discovery, settlement and building of this marvelously efficient Naval Base.

So, looking back through the history of the past few centuries we find it was Admiral Don Alonzo Vallejo, who at the command of King Ferdinand and Queen Isabella, took Columbus back a prisoner to be held pending the investigation of the authenticity of his story.

It was the distinguished Don Ignacio Vallejo who was chosen by the renowned Franciscan Father, Junipero Serra and Don Gaspar de Portola, Spanish governor of lower California, as companion and expeditionary engineer, for the exploration of Alta, (upper), California.

It was Lieutenant Don Mariano Guadelupe Vallejo; later a General, who, in 1827, at the command of the then governor of California, took 30 dragoons (horsemen known as "leather coats"), and explored the entire bay district.

After two months of extreme hardship, they returned to report to the commandant and laid on his table a map, tracing roughly the topographical features.

"Here" said Lieutenant Don Mariano, indicating with his finger, "we encamped several days, encountering many grizzlies. It is opposite the Estrachins de Yulupa, (meaning the Straits of the Sunset—"Golden Gate") and is covered with oaks.

"Bueno," said the commandant, and he wrote on the map, "Las Encinas," (the oaks—"Oakland").

"On this tongue of land projecting into the bay," said the Lieutenant, "we encamped while the cagadores returned to Pueblo San Jose for provisions, we had nothing to eat but pinol."

Bueno" said the Commandant, "we shall call it Punta del Pinto," (Pinol Point) and he wrote it on the map.

"Here are the straits," said the lieutenant, "where we found the multitude of little crabs."

The commandant tapped his forehead. He had some knowledge of the classical tongue of which he was very proud. "The Greek word for crab is Carkinos," he informed. So he then wrote on the map, "Estrashas de los Carkinos" (Straits of Carkinos).

"Here, where I've indicated a mountain, is where the Cucusuy (Indian agent of the devil; known to us as fakir), told me the devil had his abode," said the lieutenant.

"Bueno" it shall be named, Monte del Diablo." (Mount Diablo).

"Where the stream broadens into a large bay," said the lieutenant, "We met many Indians of the tribe called Suysun.

"Bueno," said the commandant, "it shall be called La Bahia de Suysun," (Suysun Bay).

"Here," added the lieutenant, "We encamped on what seemed the natural site for a town."

"Muy fino," explained the commandant, turning to him with a smile, "we shall name it after you, Vallejo."

"And here on this island," informed the lieutenant, "is where we found the mare we thought had been drowned." Then he explained how, on crossing the bay from what is now Port Costa to the Benecia side, one of his prize mares was caught in the

I hope to tell half the stories that Mare Island holds?

Not only should Mare Island be held in the minds of men for the history she has made, or for what she shall make in the future, but for the noble and romantic lineage of those brave settlers who pioneered in the early history of California, conquering the Indians by kindness and diplomacy, instead of force and blood, and giving to the world an earthly Paradise.

In tracing this back, I learned that over the river still lived one of this romantic lineage. Dr. Vallejo. I sought his acquaintance and asked him to narrate his memoirs of the discovery, settlement and building of this marvelously efficient Naval Base.

So, looking back through the history of the past few centuries we find it was Admiral Don Alonzo Vallejo, who at the command of King Ferdinand and Queen Isabella, took Columbus back a prisoner to be held pending the investigation of the authenticity of his story.

It was the distinguished Don Ignacio Vallejo who was chosen by the renowned Franciscan Father, Junipero Serra and Don Gaspar de Portola, Spanish governor of lower California, as companion and expeditionary engineer, for the exploration of Alta, (upper), California.

It was Lieutenant Don Mariano Guadelupe Vallejo; later a General, who, in 1827, at the command of the then governor of California, took 30 dragoons (horsemen known as "leather coats"), and explored the entire bay district.

After two months of extreme hardship, they returned to report to the commandant and laid on his table a map, tracing roughly the topographical features.

"Here" said Lieutenant Don Mariano, indicating with his finger, "we encamped several days, encountering many grizzlies. It is opposite the Estrachias de Yulupa, (meaning the Straits of the Sunset—"Golden Gate") and is covered with oaks.

"Bueno," said the commandant, and he wrote on the map, "Las Encinas," (the oaks—"Oakland").

"On this tongue of land projecting into the bay," said the Lieutenant, "we encamped while the cagadores returned to Pueblo San Jose for provisions, we had nothing to eat but pinol."

Bueno" said the Commandant, "we shall call it Punta del Pinto," (Pinol Point) and he wrote it on the map.

"Here are the straits," said the lieutenant, "where we found the multitude of little crabs."

The commandant tapped his forehead. He had some knowledge of the classical tongue of which he was very proud. "The Greek word for crab is Carkinos," he informed. So he then wrote on the map, "Estrashas de los Carkinos" (Straits of Carkinos).

"Here, where I've indicated a mountain, is where the Cucusuy (Indian agent of the devil; known to us as fakir), told me the devil had his abode," said the lieutenant.

"Bueno" it shall be named, Monte del Diablo." (Mount Diablo).

"Where the stream broadens into a large bay," said the lieutenant, "We met many Indians of the tribe called Suysun.

"Bueno," said the commandant, "it shall be called La Bahia de Suysun," (Suysun Bay).

"Here," added the lieutenant, "We encamped on what seemed the natural site for a town."

"Muy fino," explained the commandant, turning to him with a smile, "we shall name it after you, Vallejo."

"And here on this island," informed the lieutenant, "is where we found the mare we thought had been drowned." Then he explained how, on crossing the bay from what is now Port Costa to the Benecia side, one of his prize mares was caught in the tide and carried away. On the return trip they found the mare on an island.

"Excellente," remarked the commandant, and he wrote on the map, "Isla de la Yegua," (Island of the Mare or Mare Island.)

Little or no concern was then given to the island, due to the fact that it was infested with rattlesnakes and used as a burial ground by the Indians. (This was recently verified by the unearthing of several Indian skeletons during the construction of the new road in the rear of the shops. The Indians called the Island Cark-Toy, meaning rattlesnake town.

In 1840, a Castilian, one Victor Castro, obtained permission from the governor to herd his cattle on the island and in 1846 received a deed from Governor Alvarado, conveying to him, the title with absolute control of the island.

In 1849, William Bryant and Major Steven Cooper became the first American settlers. Later a number of others laid claim to the island but were all ordered away by the United States government, and Commodore John D. Sloat, who assisted in the capture of the bay country saw the necessity of a place where government ships could be repaired without making the long trip around the Horn. This fact was called to the attention of the Navy Department and on December 13, 1852, Secretary of the Navy John P. Kennedy, appointed he and Commander W. S. Ogden, Lieutenant I. F. Blount and Civil Engineer W. S. Sanger, as a commission for the selection of a suitable location.

For this purpose, congress, on January 4th, 1853, appropriated $100,000.

After a survey of the entire bay district they decided upon Mare Island as the most advantageous point.

Then on December 10, 1853, the Honorable Secretary of the Navy began negotiations with W. H. Davidge, an agent, for the purchase of the island.

For expenses, $11,508 was used by the commission and the balance of $88,491 was paid for the island.

A dry dock of ten sections was built in New York, tested, taken apart and freighted around the Horn to Mare Island on the vessels Empire Queen of the East, Defiance and California Packet.

The rebuilding of this sectional dock was completed in 1855 and tested by the frigate Independence, brot here for that purpose, on Monday the 10th day of December, 1855.

Previous to its completion, the government let the contract for the construction of a basin and railway at Mare Island, to cost $840,000. This was completed under the supervision of Chief Naval Constructor, Isaiah Hanscom, appointed for that purpose, on July 29, 1854.

Then on March 2, 1854, Commander D. G. Farragut, later of civil war fame, was ordered to San Francisco, to command the store ship, Warren, built in 1826, as a sister ship to the Indenendence. He took command on April 10, 1854, and was placed in official command of the Mare Island Naval Base, the first Navy Yard on the Pacific coast, on September 1, 1854.

A few days after arriving, Commander Farragut explored the entire island and in his report to the Navy Department, pronounced it a desolate waste, infested with venomous reptiles. He immediately ordered the store ship Warren brought to the island where she was fitted up for quarters.

Construction of permanent quarters was begun, and in the fall of 1855, some were completed and occupied by officers on duty at the Navy Yard.

The first officers to hold positions on Mare Island were D. G. Farragut, Captain and Commander; Thomas G.

Corbin, Lieutenant and Executive Officer; Daniel Turner, Civil Engineer; Abraham Powell, Jr., Master Carpenter and Joiner; Robert S. King, Master Blacksmith and James Warren, Master Mason.

On March 24, 1855, the brick was laid in the foundation of the first permanent building erected on Mare Island. On the same date, Chief Naval Constructor Hanscom, was appointed naval constructor for Mare Island and in 1858 built the U. S. S. Saginaw, the first war vessel constructed on the Pacific Coast.

A few years later the old sectional dock became unsafe and construction of a stone dry dock similar to that at the Norfolk Navy Yard was started and on March 21, 1886, was completed, cleared and flooded as a test.

The old Monhekin was completed about the same date and launched, and the Monadnock, started in Vallejo, was then brought to the Island and put in commission.

Introduction of electricity to the Yard came when Captain Johnson, in the early eighties purchased a clock run by electricity. Something went wrong and the clock refused to run. George E. Hanscom, then a machinist, was sent for and after successfully repairing it, was asked by Admiral McCalla, to construct a telephone from his office to the Yard Gate with such material and scraps as he might find around the place.

This was a beginning and today we have on Mare Island one of the finest electrical schools in the United States if not in the world; capable of handling 900 students at one time and giving them a course in thirty-two weeks that would cost months of time and thousands of dollars if obtained in private institutions. This school is under the direction of Naval Officers and is for the benefit only of men of the naval forces.

In 1895, practically every brick dwelling on the island was destroyed by an earthquake, and at a cost of over $100,000, were replaced by wooden structures of a more modern design.

Then, when the Spanish-American war broke out, all retired officers on the coast were called back to service and placed on Mare Island, and under the supervision of Admiral Glass, the shops worked night and day repairing ships from Pacific waters.

A shortage of coal threatened to hold up the United States forces as neutral nations were not permitted to give a ship more than enough coal to leave the ports. Admiral Dewey took the Philippines, cabled back to America for coal and Rear Admiral Kirkland, learning of the presence in San Francisco Bay of two ships, the Nero and Brutus, loaded with coal, sent at once and purchased them, brought them to Mare Island, and with a few repairs sent them to the aid of the American Commander.

As this was, at that time, the only base with a dry dock, navigation suffered enormous expense and loss of time by sending around the Horn, those ships that could not be handled here. Realizing the importance of handling these ships on the Pacific coast, the matter was referred to the department at Washington, and at once taken under advisement.

A few years later plans for a still greater dry dock were completed and an appropriation of $1,385,000 was passed and work commenced by the Atlantic, Gulf and Pacific Company. This firm, however, gave up their option, owing to changes in contract, which was later taken up and work started by the Scofield Construction Company, on February 15, 1905. This was completed on May 15, 1910, accepted by the government and tested by an official docking of the Cruiser California, on that date.

The rapid growth of the Island's population necessitated the enlargement of the hospital and in 1911, the present annex was constructed. Then, at the organization of the training camp in the spring of 1917, eight new wards were built and today the Mare Island Naval Hospital contains over one thousand beds; employs eighty nurses, two hundred hospital corpsmen and twenty-five doctors.

The U. S. Naval Training Camp, within a year, sprung from what was once a cabbage patch, to one of the most thorough training camps in the United States.

LAUNCHING OF SHIPS IN RESTRICTED WATERS.

(Published by permission and thru the courtesy of Captain H. M. Gleason, Construction Corps, U. S. N. and Lieut.-Commander H. E. Saunders, Construction Corps, U. S. N., and the Society of Naval Architects and Marine Engineers.)

ALTHOUGH there have been ten papers read before this Society giving notes and data on the launching of various types of ships, the subject of the launching of ships in restricted waters has not been touched upon.

The authors therefore have undertaken to present this subject based upon the experience of the Mare Island Navy Yard.

Unfortunately, there is very little definite information obtainable from text books, technical papers, etc., giving the results of actual launchings in which means to check the speed of ships have been used. It is therefore believed that the subject matter of this paper will be a welcome addition to the already published data on launchings.

The launching of a large ship is attained with a certain amount of risk under the most favorable conditions, and when there is added to this, the problem of checking the ship after leaving the ways, the anxiety of those responsible is not relieved until the ship comes to rest. In most shipyards in this country there is sufficient water space in wake of the building slips to allow the ship free scope, or at least sufficient water space to check the ship by the dropping of anchors. In some shipyards situated on narrow waters the building slips are inclined at an angle of about 45 degrees to give greater travel.

Various methods have been successfully used to check vessels on leaving the ways, such as:

(a) The breaking of rope stops.
(b) The use of wood friction wedges.
(c) Fitting of a mask on the stern.
(d) Dropping of anchors.
(e) Slewing the stern with the channel by dropping stern anchors.
(f) Chain drags.

Anchors are generally fitted for emergency use in connection with any of the above methods.

The most commonly used method, especially in English and Scotch shipyards, is the use of heavy chain drags. The amount of chain used varies according to the experience at the various Yards, and depends upon the nature of the surface available for the drags, launching speed, etc.; but the usual weight of chain is about 1-20th of the launching weight to bring the vessel to rest in from 200 to 300 feet after leaving the ways.

The large building slip at the Mare Island Navy Yard is set nearly at right angles to the channel which is 1230 feet wide. It is therefore necessary to check any large vessel by other means than anchors, as the

Program

LAUNCHING, U. S. S. CALIFORNIA

KEEL LAID, OCTOBER 25, 1916

CONSTRUCTION PRACTICALLY SUSPENDED DURING THE WAR
ON ACCOUNT OF URGENT DEMAND FOR DESTROYERS

LAUNCHED, NOVEMBER 20, 1919

TO BE COMMISSIONED, SEPTEMBER, 1920

SPONSOR

MRS. BARBARA STEPHENS ZANE, DAUGHTER OF GOVERNOR STEPHENS OF CALIFORNIA

ESCORT TO SPONSOR

CAPTAIN FRANK H. CLARK, U. S. N., CHIEF OF STAFF TO VICE ADMIRAL WILLIAMS
SECOND IN COMMAND, PACIFIC FLEET

THE PRINCIPAL CHARACTERISTICS OF THE CALIFORNIA ARE AS FOLLOWS

LENGTH BETWEEN PERPENDICULARS	600 FEET
LENGTH OVER-ALL	624 FEET
BREADTH, MAXIMUM	97 FEET 5 3-4 INCHES
DEPTH TO MAIN DECK	47 FEET 2 INCHES
MEAN DRAFT AT TRIAL DISPLACEMENT	30 FEET 3 INCHES
TRIAL DISPLACEMENT	32 300 TONS
CONTRACT SPEED TWELVE HOUR TRIAL	21 KNOTS
FUEL CAPACITY NORMAL	1900 TONS

MACHINERY

SHAFT HORSE POWER	26,800
SHAFTS	4
REVOLUTIONS PER MINUTE	175
BOILERS WATER TUBE	8

NOTE. THE CALIFORNIA IS AN ELECTRICALLY DRIVEN SHIP, EACH SHAFT CARRYING ITS INDEPENDENT ELECTRIC MOTOR WHICH TAKES CURRENT FROM EITHER ONE OF TWO INDEPENDENT, TURBINE DRIVEN GENERATORS.

ARMAMENT

TWELVE FOURTEEN INCH FIFTY CALIBER RIFLES, MOUNTED THREE IN EACH OF THE FOUR TURRETS.
FOURTEEN FIVE INCH RAPID FIRE GUNS.
FOUR SALUTING SIX POUNDERS.
FOUR THREE INCH ANTI-AIRCRAFT GUNS.
ONE THREE INCH LANDING GUN.
TWO THIRTY CALIBER MACHINE GUNS.
TWO ONE POUNDER BOAT GUNS.
FOUR TWENTY ONE INCH SUBMERGED TORPEDO TUBES.

GENERAL INFORMATION

THE **CALIFORNIA** WILL BE THE FLAG SHIP OF ADMIRAL RODMAN, COMMANDER IN CHIEF, PACIFIC FLEET, AND, IN ADDITION TO THE FIFTEEN OFFICERS ON HIS STAFF, WILL CARRY FIFTY SEVEN COMMISSIONED OFFICERS, AND FOURTEEN HUNDRED MEN INCLUDING SEVENTY FIVE MARINES.

ELECTRICITY WILL BE USED FOR THE FOLLOWING PURPOSES ON THE **CALIFORNIA** IN ADDITION TO PROPELLING THE SHIP. LIGHTING, VENTILATION, STEERING, HOISTING ANCHORS, HANDLING BOATS, AND THE OPERATION OF LAUNDRY MACHINERY, DISH-WASHING, MEAT CHOPPING, ICE CREAM FREEZING, POTATO PEELING, ETC. TURRETS AND GUNS ARE ELECTRICALLY HANDLED AS IS THE AMMUNITION SUPPLY; ALSO FOR SIGNALLING, RADIO TELEGRAPH AND TELEPHONE, ETC., ETC.

THE HULL OF THE **CALIFORNIA** AT THE TIME OF LAUNCHING WEIGHS APPROXIMATELY SIXTEEN THOUSAND TONS. IT IS THEREFORE ONE OF THE HEAVIEST HULLS EVER LAUNCHED. WHEN FINISHED SHE WILL CONTAIN OVER TWO MILLION RIVETS.

THE WAYS HAVE AN INCLINATION OF TWENTY TWO THIRTY SECONDS INCH TO THE HORIZONTAL AND SHE WILL LEAVE THE WAYS WITH A SPEED OF APPROXIMATELY FIFTEEN MILES PER HOUR. IF UNCHECKED SHE WOULD RUN OVER TWO AND ONE HALF MILES.

A SPECIAL BRAKE MECHANISM FOR STOPPING HER CONSISTS OF WIRE CABLES PASSING BETWEEN CAST STEEL BLOCKS WHICH ARE UNDER HYDRAULIC PRESSURE. PLEASE NOTE THESE ON EACH SIDE OF THE BOW. THE CABLES BEING WOUND ON THE LARGE DRUMS FROM WHICH THEY UNWIND AS THE VESSEL GOES DOWN THE WAYS.

space available is not sufficient for direct checkin" or for slewing the stern. The PROMETHEUS (Fleet Collier) was launched in 1908 using chain to stop her. Although the drags successfully stopped the vessel within 200 feet, the work necessary to pile the chain, to completely clear the slip of obstructions (blocking, shoring, etc.), and finally to untangle the masses of chain was extensive and costly. The next vessel launched, (August, 1912), was the Fleet Collier JUPITER of 19,000 tons loaded displacement and 5207 tons launching weight. The problem of stopping this vessel was gone into very carefully, and the final conclusion was to use chain drags. Friction brakes were considered, but the development of the idea at that time was not sufficient to warrant the trial. A description of the chain drags as used in launching the JUPITER will be of interest. In all 390 tons of chain were used coiled in 14 coils ranging from 10 to 50 tons each. The smaller coils or drags being arranged to take up first in succession to minimize the danger of parting the cables due to a too sudden stress. Seven piles of chain were placed on each side, connected up as shown below to three 2 inch diameter wire ropes attached to pads on the ship. The disposition of drags, wire ropes, and pads was as follows:-

Drag 1-A attached to pad at frame 45; weight 10 tons port and 10 tons starboard; distance of stem beyond end of ways when drag takes up, 37 feet.

Drag 1-B attached to drag 1-A; weight 15 tons port and 15 tons starboard; distance of stem beyond end of ways when drag takes up, 50 feet.

Drag 1-C attached to drag 1-B; weight 25 tons port and 25 tons starboard; distance of stem beyond end of ways when drag takes up, 60 feet.

Drag 2-A attached to pad at frame 35; weight 25 tons port and 25 tons starboard; distance of stem beyond end of ways when drag takes up, 84 feet.

Drag 2-B attached to drag 2-A; weight 25 tons port and 25 tons starboard; distance of stem beyond end of ways when drag takes up, 92 feet.

Drag 3-A attached to pad at frame 25; weight 45 tons port and 45 tons starboard; distance of stem beyond end of ways when drag takes up, 124 feet.

Drag 3-B attached to drag 3-A; weight 50 tons port and 50 tons starboard; distance of stem beyond end of ways when drag takes up, 307 feet.

Weight in all 195 tons port and 195 tons starboard, total 390 tons.

As a further precaution, two 3,000 lb. anchors, one port and one starboard, were secured on the side of the ship at frame 136, each with 10 inch hawser stopped up at intervals and carried through stern chocks. One of these anchors was to be dropped on a signal given from the bridge should the drags fail to act. These anchors were intended to turn the stern up or down stream as seemed most expedient.

The actual results of the action of the chain drags were as follows:-

Velocity of ship at time of pivoting (also maximum) 16.2 feet per second.

Velocity of ship when fully afloat 15 feet per second.

Distance run after first drag took up 213 feet.

Drags 1-A, port and starboard moved 213 feet.

Drags 1-B port and starboard moved 200 feet.

Drags 1-C, port and starboard moved 190 feet.

Drags 2-A, port and starboard moved 166 feet.

Drags 2-B, port and starboard moved 158 feet.

Drags 3-A, port and starboard moved 126 feet.

Drags 3-B were not moved.

The total weight of chain drags actually coming into play was therefore 293 tons or Launching Weight divided by eighteen.

Early in 1913 in preparing for the launching of the next ship, the Fleet Oiler KANAWHA, the development of friction brakes was actively taken up and experiments conducted which gave assurance of the practicability of friction brakes, using wire ropes passing through steel blocks under pressure. In the future design and development of these brakes advantage was taken of the data on this subject presented by Mr. A. Hiley, Associate Member of the Institute of Naval Architects, in a paper prepared by him and published in the September, 1913, issue of "The Shipbuilder."

The launching weight of the KANAWHA was estimated at 4,000 tons (actually was 4100 tons) and it was therefore estimated, from friction data obtained in experiments, that two launching brakes would be sufficient. A description of the launching brakes used and other precautions taken to check the ship is given as follows:-

The brakes were securely anchored on each side of the ship, 22 feet from the center and about 80 feet aft from the bow. In each brake the friction length employed was two 2 inch diameter steel wire ropes (6 strands of 37 wires each), 600 feet long wound on reels fitted with brakes placed about 50 feet from the brake. Springs tightened by screws produced the requisite pressure upon the ropes, which are gripped between grooves in the upper and lower steel castings. In order that the pressure applied by the tightening screws might bear equally on the two ropes, the upper casting is formed with a ridge at the center to which the pressure is transmitted by beams formed of channel sections and plate. To regulate the pressure on the rope at will, three hand winches were provided and bull wheels fastened to the nuts over the spring washers. These were connected by a 3-8 inch (diameter) endless wire rope. The two friction cables were connected by a heart shackle to a single 2 in. (diameter) wire steel hawser, 560 feet long, which was shackled to a pad on the ship's side at frame 46 and on line with the 2nd stringer, the same arrangement being used on both sides of the vessel. To assist in stopping the vessel a mask was also fitted on the stern, 16 feet wide by 11 feet high, the lower edge being 8 feet above the keel line. As a further precaution, a 11,000 lb. anchor was secured on the port side of the ship at frame 112, with a 10 inch hawser stopped up at intervals and carried to the stern bitts. This anchor was to be dropped upon signal given from the forecastle should the brakes fail to act, and was intended to turn the stern down the stream. A 6,000 lb. anchor was housed in the port hawse pipe and was to be dropped if it became necessary to hold the bow.

The results of the launching as far as they concern the launching brake were as follows:-

- Launching weight, 4,100 tons.
- Maximum velocity 16 feet per second.
- Velocity when ship floats 13 feet per second.
- Total distance friction ropes were drawn through brakes before ship was stopped, 341 feet.

The same brakes and arrangements were used in launching the MAUMEE, a sister ship to the KANAWHA. The results in the case of the MAUMEE were as follows:-

- Launching weight, 4,370 tons.
- Maximum velocity, 17.25 feet per second.
- Velocity when ship floats, 14 feet per second.
- Distance cables were drawn thru

brakes before ship stopped, 329 feet.

The same brakes, but without the stern mask, were used in launching the CUYAMA, a sister ship to the KANAWHA and MAUMEE. The results in the case of the CUYAMA were as follows:-

Launching weight 4,056 tons.

Maximum velocity, 16.7 feet per second.

Velocity when ship floats, 14.5 ft. per second.

Distance cables were drawn thru brakes before ship stopped, 444 feet.

By comparing the foregoing data the effect of the stern mask may be estimated as the CUYAMA, without the mask and with a slightly greater velocity (when afloat) travelled 125 feet farther than the MAUMEE.

The action of the wire rope cables under pressure between the upper and lower cast steel brake blocks bears a very important part in the successful operation of this type of brake. There was no reliable data on the coefficient of friction under the actual working condition, and no guide as to what type of wire rope was best suited to obtain the desired frictional resistance. These two questions were solved by numerous experiments, and actual trials on vessels launched.

As to the coefficient of friction, the figure given by Hiley in the article previously mentioned is .08. All available information in handbooks, and experiments on a small scale indicated however, that the coefficient of friction was much higher than this, presumably about .2. To check this figure and to test the apparatus, the hydraulic brake developed for the CALIFORNIA was mounted on a temporary stand and run with full pressure, using one friction wire in one of the grooves. The coefficient of friction deduced from these experiments is about .24 and the results obtained indicate that this valve remains practically constant for all loads and all speeds of the wire rope.

As to the type of wire rope to be used, it was obvious that the wire strands on the outside of the rope would have to lie exactly parallel to the axis of the rope in order to prevent "rifling." It was evident, after the first experiments, that the wire would score the grooves in the cast steel blocks, but so long as the scores remained parallel to the blocks, the action of the frictional pull on the wire ropes was entirely satisfactory, causing no unlaying or tightening up of the strands. There was some question as to whether a solid rope was necessary or whether a rope with a hemp core would not be more suitable. The latter rope, being more elastic, is less likely to seize in the grooves and for this reason has been used in all the launching operations with this brake. There had also to be considered the possibility of one or more strands breaking inside the brake and causing a jam. In this event the wire rope would likely be broken or the chain pendant to the ship carried away. During the several launchings, the outside wires in the strands have been perceptibly flattened by abrasion, but in no case has any strand parted or any wire rope jammed. In this connection it is interesting to note that the same wire ropes were used as friction ropes in the launching of three large ships, and now are in condition for use with at least as many more. From the experience gained at the Mare Island Yard the most satisfactory type of wire rope is 2 in. diameter, black, plow steel, 6 strands, 37 wires each, one hemp center, ordinary lay and 137 tons breaking strength. Particular care was required under the specifications for the rope to have the individual wires in each of the strands laid parallel to the axis of the rope at the point of frictional contact.

In connection with the launching of the battleship CALIFORNIA the number of brakes necessary was determined from the data and experience in the use of the brakes used in launching the KANAWHA, MAUMEE and CUYAMA. In these latter cases two brakes were used with satisfactory results. Therefore by comparison of the relative launching weights and velocities the number of brakes required for the CALIFORNIA was ten.

It was also considered necessary to have more definite control over the pressure to be applied to the friction blocks, and the screw, nut and bull wheel scheme was abandoned for hydraulic cylinders and pistons as shown in photographs and plans. The experiments conducted showed that two pressure cylinders were sufficient in lieu of three. Although previous experience with these brakes was sufficient to determine the number to be required in launching the CALIFORNIA, the exact pull required from the brakes collectively and individually, and the actual force required to stop the ship was not definitely known. There were also other questions on which more complete information, than was available, was considered necessary such as, — the actual pivoting point at various tides, the depth of water required to accommodate the deepest dip of the stern, the behavior and clearance of the forefoot on leaving the end of the ways, etc. It was therefore decided to construct and try out a launching model based on the law of comparison similar to model tank experiments. This model could therefore be launched at will, and as often as required, varying the conditions to suit those expected at the time of the launching.

The model was constructed with a length ratio of 1:96 (Scale 1-8 inch equals one foot), as giving a craft which was easy to handle, yet sufficiently large to make possible a fair degree of accuracy in the results.

Briefly, the dimensions of the model are as follows:-

- Length, 6 feet 3 inches.
- Beam, 12 inches.
- Weight (approx.) 39 lbs.
- Material, wood hollow, finished in spar varnish
- Displacement, longitudinal position of center of gravity and longitudinal moment of inertia may be varied at will.

The general construction of the model is shown on Print No. 4668.

The tank and the framework supporting it, shown in the photographs, require no special comment. Fresh water is used, and the contour of the river bed is represented by a layer of gravel and sand on the bottom of the tank. The water area represents the width of the channel, 1230 feet, by a certain portion of its length, 320 feet. A modified form of hook guage records the tide level in feet and tenths. The ground ways, (with camber), the ship, the cofferdam bulkheads, crane piers, etc., are, of course, all reproduced exactly to scale.

To obtain correct results by the method of comparison, it is necessary for the model to run off the ways and through the water at its "corresponding speed." By running on a system of rails and steel wheels with hardened pivots it was possible for the model to accelerate itself at the required rate without the application of any external force. A central rail under the keel of the model runs on two large flanged wheels, one under the vessel and one at the end of the ways; two wheels at the fore poppets run on two rails which represent the ribbands of the ground ways. This system of mounting the model on three points was suggested by Mr. Percy A. Hillhouse and Mr. Wm. H. Riddlesworth in a paper presented by them at the Fifty-eighth Session of the Institution of Naval Architects, March 29, 1915, as being decidedly preferable to mounting on six wheels, especially when the ways were cambered. The forward keel wheel of the CALIFORNIA model supports the weight until the keel track reaches the after keel wheel; the latter then supports the weight until the model pivots, when a special releasing device drops it clear of the forefoot as the model leaves the ways.

Although not shown on the photographs, the tumbling shores, cribs, reels and brakes were later added to the model, in order that launching drills might be held at the model, and the various gangs acquainted with their duties and the sequence of operations. A small brass preventer dog shore, and a set of solenoid operated mechanical triggers represent accurately the dog shores and hydraulic triggers on the ship. Two brass trimming masts, with pencils attached, erected at the forward and after perpendiculars, record the traces of the bow and the stern at all points of the launching operation.

A special recording mechanism was designed and built, to record simultaneously all data and to make the model as nearly as possible automatic in its operation. Reference to the photographs will indicate the general arrangement of this machine. Without undue elaboration of details, the construction and operation of this mechanism may be described as follows:-

A small cord (or cable, as it will hereafter be called) is fastened by a wire hook to an eye plate in the bow of the model at the 16 foot water line. This cable is led forward over an aluminum idler pulley carried on a swinging frame and then back and around a small drum about 1 1-2 inches in diameter. Sufficient cable can be wound in a single layer on this drum to permit the model to run to the far end of the channel. The drum, as shown on Print No. 4946, has two silver contacts on a small commutator and acts therefore as a chronograph, giving two marks per revolution on the recording paper. A standard Navy mean time break-circuit chronometer indicates seconds on the recording paper (be means of suitable colenoids and pencils) as a reference for the chronograph readings. The recording paper is that supplied for the Burroughs adding machine; it is drawn at constant speed over the paper table by two rubber rollers geared to a small D. C. motor. A small controller with adjustable segments, also driven from this motor, controls the current to the solenoid triggers and to the tripping coils of the brakes; this controller switches on and off the motor and other solenoid circuits and renders the mechanism entirely automatic in its operations. As the entire launch consumes only 7 or 8 seconds, it is not practicable to arrange for manual operation in this connection.

The launching brake mechanism, also to be very briefly described, does not, of course, operate in exactly the same manner as the brakes on the full-sized vessel. The small drum upon which the cable is wound is constructed with heads of highly polished steel. Cork insert brakes, carried on swinging plates, bear against the heads of the cable drum and serve to retard the angular motion of the latter when the brakes are applied. The assembly of these plates, together with the cords and weights used to clamp them against the drum, is shown on Prints Nos. 4947 and 4948. It will be seen that small coil springs hold the plates clear of the drum when the brakes are to run free.

The weight carriers and weights are released by colenoid operated triggers, as shown on Print No. 4945; pistons on the weight carriers work in oil dashpots so as to prevent vibrations of the brake recording pencil, and pistons may be changed so as to give a sudden or gradual application of the brakes as desired.

The cable pull exerted on the model by the brakes is recorded as follows: The aluminum idler pulley, as may be seen by referring again to Print No. 4946, carries the bight of the cable which is attached to the model and being unwound from the drum. Any retardation of the drum, as the cable is being paid out, exerts at once a pull on the model, and the combined action of these two forces causes the swinging arm to move. The angular motion of the latter is, however, controlled by the action of two balanced springs at the lower end of the arm; whatever movement takes place is proportional to the resistance of the brakes and is recorded on the paper by a pencil attached to the extreme upper end of the arm. This entire mechanism is accurately calibrated in such a manner that all errors due to angularity, inequalities in the springs, etc., are entirely eliminated.

A short account of the sequence of operations during a launch may serve to explain more clearly the exact method of recording the desired information. Assume first, that the model has been released and is moving down the ways; the cable is paying out freely as the only resistance is that of the small brush on the chronograph segments.

(1) At the designated moment, the controller operates the brake release and allows the weight carrier and the weights to drop.

(2) The weight carrier, acting thru the cords, causes the brakes to grip the revolving drum;

(3) The latter, although continuing to revolve and to act as a chronograph is retarded somewhat by the action of the brake;

(4) A pull is exerted on the cable which, leading around the idler pulley so as to effect a change of direction of 180 degrees, draws the latter toward the model against the action of the double springs;

(5) The pencil attached to the arm records the cable pull on the moving paper strip while a stationary pencil traces at the same time a zero or reference line.

From what has been said in the preceding paragraphs, it will be evident that all elements of the launching conditions may be varied at will, using the apparatus to record all the data for successive series of runs. The various unknown factors are then determined as described below. With regard to the actual performance of the model, it may be said that all parts of the mechanism functioned in a most satisfactory manner and that the results for corresponding and similar runs were remarkably consistent.

To work up the results, it is of course necessary to apply the principles of mechanical similitude as is done for all work in the model basin.

The length ratio, L, being 96, the corresponding speed ratio is L equals 96 equals 9.798. Inasmuch as the maximum launching speed of the model is about three feet per second, corresponding to a ship speed of 29 feet per second, and as the vessel in any circumstances would never attain such a high velocity, means are adopted to reduce and regulate this velocity to correspond with what may be reasonably be expected on the day of the launch. A short length of cord is attached to the model and drawn thru an improvised friction brake, the length of cord being varied to suit the final launching velocity required. As the effect of this retardation is only to reduce the initial velocity and as this action ceases long before the brakes are applied, it need not be considered except when determining the shape of the entire velocity curve. The final speed (when entering the water) may be varied in this way from 12 feet to 24 feet per second.

The chronograph is so proportioned that each of the intervals between record marks represents about 19.2 feet travel of the vessel. A specimen record is shown on Plan No. 23421. For the sake of convenience, all units, unless otherwise noted, will hereafter be expressed in proper terms for the full-sized vessel. All calculations and all curves have been worked up on this basis, as the work is then more easily followed by all concerned.

The length ratio, L as noted above, is 96.

The displacement ratio is therefore L equals 884.736. For a weight of ship and cradle of 16,000 tons, this corresponds to a model weight of 40.52 pounds.

The ratio of cable pull on the model and brake pull on the ship is also L or 884.736. (From the theory of mechanical similitude, where F x S equals one half m v).

A pull of 500,000 pounds on the ship is equivalent to a pull on the model cable of 9.042 ounces, which in turn, is represented by an ordinate of .81 inches on the recording paper. The model brake is capable of exerting a total relative pull of about 900,000 pounds, or some 400 tons.

The brake mechanism has been calibrated with extreme care, using a specially constructed and calibrated spring to exert a tension upon the cable in its normal direction, with the brakes set and the recording mechanism in operation. After repeated measurements of the resistance, due to the rotation of the drum, the rotation of the idler pully and the friction of the pencils on the trimming masts, it has been assumed that this resistance may be neglected, as being within the limits of accuracy of the observations as a whole.

In order that the traces of the bow and stern may be correct in shape it is necessary that the moment of inertia of the model about a transverse horizontal axis through its center of gravity should bear the proper relation to that of the large vessel; that is, "K", the radius of gyration, should vary as "L". To this end, the model is suspended by two cords of known length equidistant from the center of gravity, and "K" determined in the usual manner. The inside lead ballast weights are then placed in such position as to fulfill the required conditions. It is understood, of course, that "K" for the large vessel must be found by more or less approximate methods. The pivoting point, the drop of the bow, the clearance of bow and stern, the final trim afloat and the position of the model when it comes to rest are easily obtained from the record of the trimming masts. The time and point of application of the brakes are indicated on the recording strip as shown on the plan.

For purposes of illustration, there is shown a complete set of curves and data obtained from a set of runs with the model. To facilitate the transfer of all data from the model record to these curves, a set of nomographs has been prepared, giving rapid solutions of about six of the principal equations. The velocity—distance curve, Run No. 119 and the velocity-distance curve, Run No. 121, are drawn directly from the chronograph record. The time-distance curve, Run No. 119, has been plotted as a convenience in checking from the curves of the CUYAMA. The curve of brake pull, Run No. 119, is taken directly from the diagram on the record sheet and the traces of bow and stern pencils from the vertical board shown in the photographs. The contour of bow and stern have been added to make the diagram more complete.

In the figures presented by Mr. Hiley in his paper on the launching brake, the water resistance is assumed to absorb about 20 per cent of the total energy of the vessel. This figure is necessarily quite approximate, for reasons stated at the beginning of this paper, and an attempt has been made at this point to arrive at a more definite value of this quantity. As is well known, the water resistance of the vessel during launching can be represented by the equation R w equals K 2 V4, provided the cradle and other fittings are of such shape as to produce wave-making resistance only. This is not exactly the case, however, as the skin friction resistance is a considerable portion of the whole; the water resistance is best represented, therefore, by a simple equation of the form R w equals K 2 V 3. Although this equation, as it stands, does not conform exactly to the theory of mechanical similitude, it is used here as a means of simplifying the work. To translate model resistances into ship resistances would require an excessive amount of work, if this operation were to be carried out exactly as is done at the Model Basin.

By substitution and integration of the equation R w equals K 2 V 3, we find that the velocity-distance curve is represented by the following equation, V equals M over K 2 S equals K over S. Where V is the velocity and S the distance run, measured from a certain origin, K 1 and K 2 are constants. The value of K, for this hyperbolic curve may be found by solving two simultaneous equations representing two points on the velocity curve where the vessel is clear of the ways and running freely.

The curve of velocity thus obtained is only the approximate but it agrees closely with the curve as actually recorded, and it forms a very convenient means of computing the water resistance during the period when the ship is being brought to rest by the brakes. For instance, two points on the curve of Run No. 121 are taken at 19 feet per second and 14 feet per second; the two equations are then V S equals K equals 13,085 and R w equals K 2 V 3 equals 81.64 V 3.

The second equation enables us to plot the curve of water resistance as shown on the plan, taking values of velocity, of course, from the curve of Run No. 119. When integrated, the curves give the following results:-

Total energy absorbed by water resistance, 66,740,000 ft. lbs.

Total energy absorbed by brake resistance, 138,360,000 ft. lbs.

Kinetic energy of vessel traveling at 19.4 ft. per second when brakes are applied, 201,600,00 ft. lbs.

Difference, 3,500,000 ft. lbs.

Representing an error or discrepancy of less than 2 per cent.

Note that in this case the resistance of the water absorbed about 32 1-2 per cent of the total energy.

Inasmuch as the results shown in the preceding paragraph are obtained by entirely independent methods, the check is very positive and the agreement remarkably close. The curve of brake pull is considered so reliable, that, from data on similar model runs to be made just before the launch, the pressure in the hydraulic brake cylinders and the point of application of the brakes will be determined.

For purposes of comparison, the velocity-distance curve of the CUYAMA has been added. The similarity between this curve and the one obtained from the model is most apparent.

It has been necessary throughout this paper, to comment rather briefly upon what is really a very comprehensive subject, and it has been the intention to supplement this brief description with such photographs and plans as would serve to explain clearly the subject matter of this article. Unfortunately, at the time this paper was prepared, the launch of the battleship CALIFORNIA had not taken place and it was not possible to make extended comparison of the data obtained from the model and the final data from the actual launch. It is hoped that when this matter has been worked up, there will be further opportunity to present it to the Society in a subsequent paper.