HOW WARSHIPS ARE TESTED.

Miniature Basin in Which the Models Are Practiced.

For over fifteen years Admiral Hichborn, chief of the construction bureau of the navy, has been endeavoring to secure the building of an experimental naval basin. He was sent abroad by Secretary Chandler as far back as 1881 to see what improvements had been devised in ship building by other countries, and came back with the idea for this in his brain. But it was not until towards the close of the fifty-fourth congress that he was able to secure an appropriation of the necessary $150,000 to put his plans into operation. The need of such tanks has been recognized for a still longer time, but the governments have hesitated to go into it sufficiently to attain the best results. Mr. William Denny, the most progressive of the Scotch builders, and the owner of the only private basin in the world, said recently in discussing the question: "Of all the problems about a steamship the only ones incapable of being solved at the present moment by a priori method are those relating to speed and power. No ability and no training will enable even the most skillful architect to overcome the want of an experimental tank in coping with these two questions." It is to find out this ideal hull—the one that will attain the maximum result of speed, of carrying power, or of whatever other quality that may be desired—that the United States has erected, after many years of solicitation on the part of the bureau of construction and repair, this enormous basin. The basin was authorized by congress two years ago, and already partial experiments have been begun to determine the best shapes for the hulls of the new warships authorized last March. The tank has a length of 500 feet and along each of its long sides is laid a railway on which runs a "towing carriage," which extends like a bridge over the tank from side to side. When the great weight of the vehicle, twenty-five tons, is taken into consideration, as well as the rapidity with which it moves and the perfect control under which it operates at all times, it will be easily understood that the whole process of operation is little short of marvelous. In fact the motor carriage of the model basin is a mechanical wonder and a thing almost entirely unique. On it is a complicated piece of machinery, worked by the Ward-Leonard system of electrical control, capable of driving the carriage along at twenty-five miles an hour, within 200 feet of the starting place. Hung to this bridge carriage by means of a dynamometer, will be the various models which it is designed to test, each loaded so as to float the exact proportionate depth designed for the ship. As the carriage sweeps along towing the model, the dynamometer will register the resistence of the water to that particular form of bow at each speed from one knot an hour up to thirty. If it is found that the resistence is greater than it should be, the model will be taken back to the carpentering establishment and trimmed down or built out, as may be thought best, and then tried again and again until the very best shape for the purpose intended is resolved upon.

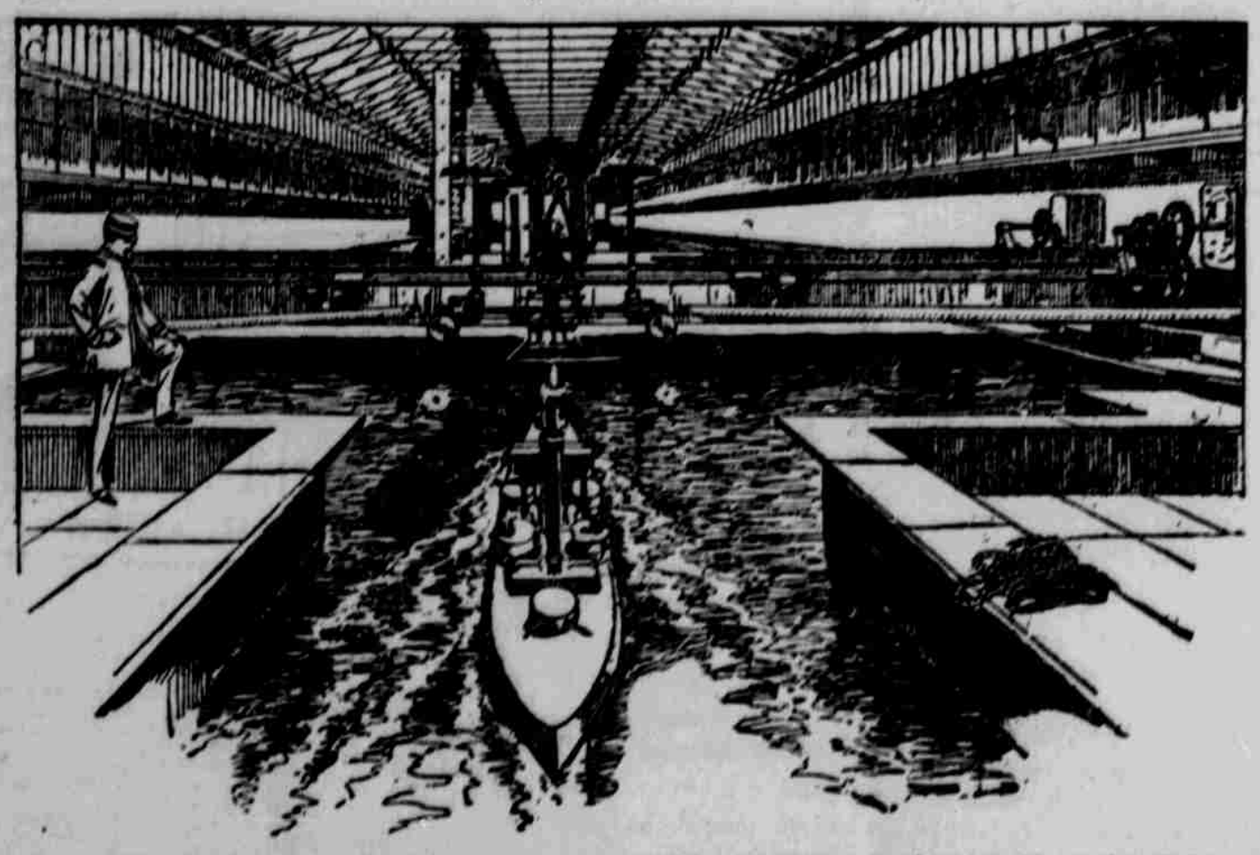
When one is finally adopted, the resistence of the water to its progress at various speeds will be carefully noted, and from this it will be very simple to calculate the exact power of the engines required to give the ship, when built, the greatest speed. Hereafter there will be no danger that the engines will be found too weak, thus losing speed, or too heavy and strong, thus losing weight, that might be better devoted to some other part of the vessel.

There is one special advantage in the high speed which can be attained in the tank which a layman will necessarily overlook. It results from the tendency of a ship to bore downwards in the water. The faster she goes the deeper she will bore, the more of her will be submerged and large will be the displacement. For instance the coast defense vessel Monterey, when running at full speed, plunges her entire body under water, thus offering a much greater surface to the water and increasing the resistence to her passage. It is evident that portions of the bow which are well out of the water at ten knots—the maximum speed attainable in any of the European tanks—will be submerged entirely at twenty knots, and that as much care should be taken to design so as to offer the least resistance of the upper portion to the water as is taken with the lower portions, which are always submerged. Yet never in the history of the world has it been possible to ascertain the best shape for them in advance of actual test after the ship has been completed, when, of course, it is too late for alteration.

Objections may be made that the tank offers, after all, only smooth water facilities, and will not give evidence as to work in a sea way. At one end of the tank is to be placed a powerful propeller, which will send waves to meet the model quite as strongly proportionately to the size as are likely to be encountered by the ship in the open sea. Further, in one corner of the building which incloses the entire tank will be placed a powerful electric fan, which can get up a very good imitation of a gale of wind.

All these points were worked out very carefully by Naval Constructor David W. Taylor before the building of the plant was begun, and there was theoretically no doubt that all would work correctly. Still, careful tests were determined upon to show that these calculations were accurate. In other words, to make everything perfectly safe, the "sum" had to be "proved."

For this purpose, models have been or are being constructed of the Iowa, the Brooklyn, the Raleigh, and other vessels at present in existence. Abundant records, of course, exist as to the speed of these actual vessels in all sorts of weather and under all conditions. If, when their models are tested in the tank, they should give results which, when worked out, should agree with the results in actual practice, it would be proof that other ships built on models obtained in the tank would also give the expected results. If, on the other hand, it were found that the results were somewhat different, they would give a basis for calculating the amount by which the final ship should be made to differ from the tank model.



Naturally, Mr. Taylor felt more or less anxiety in regard to the first experiment. This was made with a twenty-foot wooden model of the Iowa, double the length of any model used abroad. So far, this has been tested at various speed up to twelve knots, and the results have been practically identical with those shown by the Iowa's log books. In a few days experiments will be made at greater speeds. At present the machinery is so new that it is not thought prudent to use too great velocity. As the various parts get adjusted to each other, and the machinery, so to speak, "finds" itself, the speeds will be increased till they reach the maximum. At present everything is rough and discordant, and makes a great deal of noise. This, the men in charge say, will soon wear off.

HALF A CENTURY AGO.

Why People Didn't Need Vacations in Those Days.

George S. Boutwell, ex-governor and ex-senator, writes to the Boston Globe: "There is very good reason why people need more vacation now than in the past. Today the hours of labor for the average mechanic may be very much less than formerly, but the kind of labor that he performs is greatly more exacting and wearing than the work of a mechanic was 50 years ago. A man laboring in a shop or a factory or on the farm today must do everything with great care and skill. If he works only eight hours a day the work is steady and uninterrupted and it demands an expenditure of considerable intellectual effort. When I was a boy, a farm hand, for example, went about his tasks leisurely, stopped to talk and to rest frequently during the day, and insisted on an occasional draft of rum. His hours of labor may have been from sun up to sun down, but his actual time of labor was much less than that of a farm hand today. Fifty years ago it was the same in every other kind of occupation. A mechanic went about his work without any sense of hurry. Nobody seemed to hurry in those days. The business man had fewer cares and lighter responsibilities. There was seldom a rush about anything, because the facilities for rushing were not so numerous as they are today. There was no railroads when I was a boy, no telegraph, no telephone, no six-day ocean steamers. Everything necessarily was on a slower scale. Men's nerves were not constantly straining, and the anxieties of a week were not so great as the anxieties of a day are now. This was true also of the professions. The clergyman had to preach twice on Sunday, but the kind of sermon that was expected of him did not involve close study of contemporary affairs. During the week he did practically as he liked. The clergyman today has innumerable demands on his time and energy, with all kinds of charitable and philanthropic and quasi-clerical projects and organizations. He must be a man of active affairs. Sixty years ago the lawyers had an infinitely narrower field. People went to law about a strip of land or a title to a piece of property. Today the lawyers handle cases involving the most intricate commercial complications and engage in the settlement of disputes over millions of dollars. There were no patent cases half a century ago, and today there are thousands, and the lawyers who handle them must be good mechanics as well as learned in the law. So it is true of every profession and almost every occupation today. A man works harder and longer, and has greater anxiety and heavier responsibility. I believe that vacations save many lives. They are very necessary, because the life that we lead drains the system of its strength, and the mechanic must stop for rest and repair or break down."

NIPPONISM IN JAPAN.

It Is a Drawing Back Into the National Shell.

A Japanese boy, a middle-school student, came into my study the other day and said he did not believe in using any foreign language in speaking to foreigners, says the Kobe Herald. He believes all Japanese ought to use their own language, and make foreigners learn to speak in Japanese. This was so unique and refreshing, coming from a student, that I was in a quandary for a moment, not knowing how to take it. But he informed me that he was a Nippon Shugi man, and that was the way to preserve national institutions. There is a growing dread among a large class of Japanese that the national institutions are in danger of being swallowed up in the hurried Europeanizing of things; hence the spread of Nipponism, the drawing back into a national shell. The national spirit will be lost if too much leaning toward foreign things is allowed, hence the absence of any English on the recent issue of postage stamps. The May number of the Taiyo has not one word of English in it—not even The Sun on the title page. No more English contents, no English names under the pictures. Nipponism has gone mad.

Silencing an Audience.

A clever bit of campaign repartee is accredited to Lee Fairchild, the California orator who leaped into national repute in 1869. He was sent into a Southern state to advocate the gold standard. At a certain place he was informed by the committee that the "rally" would begin and end about the same time, and that not since 1883 had any republican speaker been permitted to finish a speech there. Upon learning that the speakers as a rule had been able to get out of the town and fill their next appointments, Fairchild determined to make the attempt as billed. He advised the chairman to have no music and to introduce him by saying to the audience: "You are the people and here is the speaker." The chairman followed instructions a little too literally. He simply pointed at the audience and then at the speaker and disappeared behind the scenes. Fairchild began his speech at once with one of his famous stories. The audience was separated, the colored folk all being in the gallery, and only white people below. In about five minutes the speaker made a pointed thrust at the opponent party, when an organized body of young men in the center of the theater shouted in concert: "Rats!" Fairchild paused for a moment, and then waving his hand at the gallery said: "Waiter, come down and take the Chinamen's orders!" The effect was electrical. The speaker in relating the incident to the writer said: "You should have seen that black hillside of faces sloping 'heavenward break into ledges of pearls."

DEWEY'S SHIRT SYSTEM.

Scheme to Give Each Garment the Same Amount of Wear.

There resides in Washington at the present time a man who has known Admiral Dewey for the past thirty years, during which time their acquaintance has been marked by the most friendly and social intercourse. In speaking of the true character of the famous naval hero this friend said: "There is little difference between the Dewey of today and the Dewey of 25 years ago. Dewey was as popular an officer as could be found in the navy, and during our cruises he was always a desired guest at banquets. He was a splendid messmate, full of manly sentiment, and ever ready to lend the melody of his sweet tenor voice in a chorus. One trait that always attracted the attention of the acquaintance of Admiral Dewey was his extremely neat appearance. He dressed in the morning with a strict regard for the demands of a professional man, and when he left his apartments for the club in the evening his outfit could be used as a model for a society man. His figure is rather below medium height, but trim and well knit. From the conservatively shaped hat to the round-toed shoes he wore, everything bore the earmarks of gentility and refinement. He was fastidious about every feature of his dress, and always had his shoes made on the same-shaped last. The care he observed in his dress was followed in the arrangement of his wardrobe. Everything had its place, and he knew exactly where to find a handkerchief, a shirt or collar. In fact, he might be called a crank on the subject, having invented an odd custom for keeping his shirts so that one could not be worn oftener than another. They are all numbered, ranging from 1 to 31. He had a chiffonier containing an equal number of drawers, just wide enough to receive a shirt. He begins at the top and wears the shirt in drawer No. 1, then the garment in drawer No. 2, and so on down the line. He is just as particular about other parts of his wardrobe, also."—Brooklyn Eagle.

Napoleon's Death Mask.

On March 4, 1821, the day after the great Napoleon died, Automarchi, his physician, took a plaster cast of his face, and for this death mask he was soon afterward offered £6,000 by a wealthy London collector of curiosities. He refused the offer and retained the mask in his possession until he had secured a perfect copy of it in bronze. The original cast was then offered for sale in London, the price asked being first £6,000, and afterwards £5,000. No purchaser, however, appeared, and the same was the case in Brussels, where the price asked was 100,000 francs. The bronze mask had meanwhile become the property of the society entitled the Sons of Glory, all of whom were at one time officers of the grand army. Whenever a member of the society died the mask was placed on his coffin during the funeral services. After the death of the last member the mask passed into the possession of Miss Forty, an English lady. She has just died, and at the sale of her effects the once famous mask fetched a comparatively small sum—ridiculously small, indeed, when compared with the sum which was once offered to Automarchi.

Another Blue Grotto.

The famous Blue grotto of Capri has now a rival in the state of Minnesota. It occurs in a lake on the shores of which there is a cavern of white limestone flooded with water. A swimmer enters the cave, and, turning to look upward, sees the most beautiful shades of green and blue in the water and a silvery sheen over his submerged limbs.

Iron Holder.

Tops of worn-out boots or shoes make excellent iron holders.

A USEFUL INSECT.

IT IS INDISPENSABLE TO THE SMYRNA FIG.

California Couldn't Raise This Fruit Without Importing the Little Bug to Do the Business—The Federal Government Interested.

While agriculturists, scientific and practical, are devising means all over the world to fight insect pests, the United States department of agriculture has just succeeded in making at least one insect aid it in the work of raising fruit. This remarkable development of a combination of entomology and agriculture will enable the fruit growers of the West to raise a fruit new to America and one of vast commercial value—the famous and excellent Smyrna fig.

For many years California's fruit growers have tried in vain to raise this particularly desirable fruit. Much money was wasted for plants and cuttings, experts from Smyrna and the Mediterranean shores were brought here by private persons, and time and labor were expended patiently to no avail. When the scientists of the federal government began their investigation the Californians were about ready to abandon the attempt. But now there seems to be hardly a chance of failure, all owing to the microscope and the scientist with his theories. They have done what the "practical" orchard owner could not do with all his experience.

The federal government's experts found that the Smyrna fig would not grow here because we lacked a little insect that lived on the leaves of the trees in Smyrna and, by flying from one to the other, fertilized them. So at once from Washington orders went to Smyrna for some of these little bugs, which were christened with the hard and undeserved name of Blastophaga.

The question had been studied for some time by Dr. Eisen of the California Academy of Sciences, George C. Roeding of Fresno, Cal., and John Rock of Niles, Cal. At Fresno and Niles many Smyrna figs, as well as wild figs from southern Europe, in which the fertilized insect develops, were started. Dr. Howard, the entomologist of the department of agriculture, went to California to look over the ground to learn the conditions and to settle on the best points at which to attempt the introduction of the European insect. Another agent of the department, Walter T. Swingle, was sent to southern Europe, partly to send to this country cuttings of all varieties of wild figs which could be found, and to send over living specimens of the Blastophaga.

It was thought worth while to send to this country the fruit of the wild fig, or the Capri fig, as it is called, containing the living insects, and this was done on many occasions by Mr. Swingle. A Capri fig tree was inclosed at Mr. Roeding's place at Fresno, and, on the arrival of the European figs, the insects, which were found to be in good condition, were liberated within the inclosure. The living insects previously had been obtained by correspondence by James Shinn of Niles and by Mr. Roeding, but the insects had died before reproducing. Mr. Swingle adopted a new method of packing for transportation, each fig being carefully wrapped in tin foil and sealed with wax. The first specimens were received at Fresno in the early part of May, 1898, but, so far as could be observed, none of them laid eggs either from this or subsequent sendings. All through the intervening year wild fig cuttings have been received and started under varying conditions. It was realized that the attempts thus far described were problematical in their results, and the chances of success were small. It was planned, therefore, to transplant Capri fig trees into large tubs and carry them across the Atlantic in growing condition with their fruit and the contained insects; and one rather large tree was sent over last spring by Mr. Swingle.

It now turns out, however, that by great good fortune some of the insects brought over in 1898 did succeed in penetrating the closed flowers of the Capri figs growing at Fresno, and that they laid their eggs and have practically established themselves in California. The first step of the experimental work is, therefore, a success. Since the insect has maintained itself for an entire year, there is reason to suppose that it will continue to breed, and that California in the near future will be able to place a fig upon the market which will possess the same superior flavor as that which has given the imported Smyrna figs their pre-eminent commercial rank. This flavor seems without doubt to be dependent upon the number of ripened seeds within the fruit. This fact has been learned through experiments in the artificial fertilization of Smyrna figs grown in California. Experiments were made by Dr. Eisen and Mr. Roeding, with the transfer of pollen from Capri figs by means of a toothpick and by means of a blowpipe. In this way a large number of seeds were fertilized, probably half as many as are fertilized by the work of the Blastophaga in Asia Minor, but already the characteristic flavor of the European figs was noticed.

The Other Side of It.

From the Chicago News: She (at the depot)—"It must be awfully hard for these poor foreigners who come to this country to find themselves strangers in a strange land." He—"Oh, they don't mind it. You see, they are used to it, having been born and raised in foreign lands." She—"True; I never thought of that."

CAGED BEAUTIES

Exposed For Sale to the Passer-By in Algerian Marts.

Mr. William Shark describes in London Literature a visit, while in Algeria, to a street of caged women. It seems it is forbidden to Europeans after dark, but he wandered in, partly through incident, partly through curiosity. He writes: "Some women were in barred rooms and some in cages, offered for sale. The woman in the first cage I passed was rather pretty, and, though her hair was dark, she had pale blue eyes. Her long loose tresses were everywhere clasped with little blue brooches, and I noticed that her lips, the end of her ears and her finger tips were stained a dull red. She accosted me in Moorish-French, and asked me if I would not like to take her away from these jackals of Moors and Arabs. I said I was a stranger, a wayfarer, and if here today might be far tomorrow. She told me she was not an Arab ('Allah be praised!') and not a Moor, either, but a Koulourli—that is, the child of a Moorish woman by a Turkish father. One girl's face and manner impressed me greatly. She was not beautiful, hardly pretty, but she had a singularly winsome face, with large, fine, gazelle-like eyes. She was a European, a Spaniard, from one of the Balearic Isles. Strangely, she was very fair, with blonde hair full of a dusky gold sheen. She has been taken to Oran, at the extreme western end of Algeria, by a Spanish naval officer, and there in a few weeks had been deserted. For some months she was a derelict in that old Hispano-Mauresque town. After her child was born she had gone inland to hill-set Tlemcen, the old Moorish town that stands within sight of the frontier of Morocco. There a rich Moor had taken her to his harem. On his death a few months later she had been purchased by a Jew from Algiers, and straightway sold to a young Turk at Bona. The Turk, when tired of her, disposed of his property to an Arab sheik, who had grown tired of her in turn and placed her in the street cage, an article for sale. For some minutes I stood talking to a poor imprisoned creature, when a passing guard took notice of the incident and whispered to me in French to move away at once and return to the foreign quarter. He had passed on before I could see his face. The next moment I descried the evil countenance of a Jewish-looking Moor, behind the cage of the Oran woman. He was her owner and he had been listening to our conversation. When he discovered that he had not a purchaser to deal with he came forward brusquely. 'Do you want her or not?' he demanded, sneeringly, in gutteral Algerian French. 'No? Then be off with you, infidel dog, and by the way you came if you value your skin.'"

A NATURE-LOVER'S WEALTH

The following extract from an interview with Mr. John Burroughs, recently published in Success, contains things that are well worth thinking about:

"I consider the desire which most persons have for the luxuries that money can buy an error of mind. It means nothing except a lack of higher tastes. Such wants are not necessary wants, not honorable wants. If you cannot get wealth with a noble purpose, it is better to abandon it and get something else.

"Peace of mind is one of the best things to seek—and finer tastes and feelings. The man who gets these, and maintains himself comfortably, is much more admirable and successful than the man who gets money and neglects these. The realm of power has no fascination for me. I would rather have my seclusion and peace of mind.

"This log hut, with its bare floors, is sufficient. I am set down among the beauties of nature, and in no danger of losing the riches that are scattered all about. No one will take my walks or my brook away from me. Flowers, birds and animals are plentifully provided. I have enough to eat and to wear, and time to see how beautiful the world is, and to enjoy it.

"The whole world is after your money, or the things you have bought with your money. It is the trying to keep them that makes them seem so precious.

"I live to broaden and enjoy my own life, believing that in so doing I do what is best for every one. If I had run after birds only to write about them, I should never have written anything that any one else would have cared to read. I must write from sympathy and love—that is, from enjoyment—or not at all.

Where the Great Forests Are.

A table in Science shows that Canada leads all other countries in the extent of her forests. She possesses 799,230,720 acres of forest-covered land, as against 450,000,000 acres in the United States. Russia is credited with 498,240,000 acres, about 48,000,000 more than the United States. India comes next with 140,000,000. Germany has 34,347,000 acres, France 23,466,450, and the British islands only 2,695,000. The table does not include Africa or South America, both of which contain immense forests. It may surprise some readers to learn that the percentage of forest-covered land is larger in several European countries, Germany for instance, than in the United States.

Dangerous Place.

First Tragedian—Just listen to this: "In California there are ostrich eggs weighing three pounds." Second Tragedian—Great Scott! Isn't it lucky our troupe didn't get a chance to play in California this year?