

Prof. Edward Orton, the State geologist of Ohio, as president of the A. A. S. for 1899. Prof. Orton was born at Deposit, N. Y., March 9, 1829, was educated at Hamilton College, and at the Lawrence Scientific School, Harvard University. He was for a time professor of natural history in the New York Normal School, and afterward held a similar place at Antioch College, of which he was subsequently elected president. In 1873 he was made president of the Ohio State University. Since 1881 he has had charge of the Ohio State Survey.

The Integrity of the Spanish Dominions.

When Philip II. began to reign, Spain was the most powerful nation in the world. So vast were her possessions in Europe, Asia, Africa, and America, that "the sun never set on her dominions;" but with the beginning of the decadence, before his death and in the first years of the reign of his immediate successor, nearly all her possessions in North Africa, Burgundy, Naples, Sicily, and Milan were lost.

In modern times her losses have been as follows:

- 1628, Malacca, Ceylon, Java.
- 1640, Portugal.
- 1648, Officially renounced her rights over Holland.
- 1649, A number of strong fortresses in the Netherlands.
- 1659, Roussillon and Sardinia.
- 1648-1713, Flanders.
- 1697, Island of Hayti, except Santo Domingo.
- 1704, Gibraltar.
- 1795, Santo Domingo.
- 1797, Trinidad.
- 1800, Louisiana.
- 1819, Florida.
- 1810-21, Mexico, Venezuela, Colombia, Ecuador, Peru, Bolivia, Chile, Argentina, Uruguay, Paraguay, Guatemala, Honduras, Nicaragua, San Salvador, etc.
- 1898, Cuba, Porto Rico, Philippines, Marianas or Ladrone Islands.

What will remain for her to lose in the twentieth century? Perhaps the home country.—From *Patria*, the New York organ of the Cuban revolutionists.

Mountain Railway in the Tropics.

There have been many rack railways, but the one constructed in Sumatra is said to be the first of its kind, of any considerable length, that has been built for purely industrial purposes, says *The Trade Journals Review*. Like all other pioneer undertakings, its completion has not been effected without the usual accompaniment of difficulties, and these were not lessened by the fact that that part of the earth's surface traversed by the iron path was an almost unknown region when the enterprise was set a-going. This line crosses the Barisan mountain range and now forms part of the Sumatra state railways. The rack is of the Riggenbach type, made of two soft steel channels joined by riveted pins. The rack itself is bolted to cast iron chairs fastened to steel sleepers, which latter also carry the ordinary rails. The locomotives were built at Stuttgart. They are made to draw maximum train loads of 65 tons up the incline and 70 tons on the down grade of the steep western slope, but on the eastern side, 90 tons for the up trains and 110 tons down. The mean speed is 8 miles per hour. The total length of the railway is 19 miles, the greatest elevation overcome is 3,875 feet, the maximum rise being 8 per cent and the minimum radius of curve 492 feet. The railway is built for conveying coal from rich mines near the river Ombilien to the new port of Pedang.

Extent of the Yukon Gold Fields.

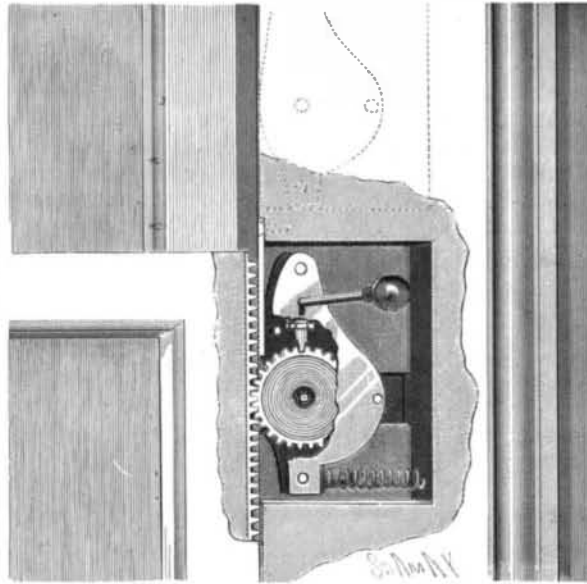
Mr. William Ogilvie, chief of the geographical survey of Northwestern Canada, and who, for six years, has been engaged in the Mackenzie and Yukon River districts, declares the Yukon gold fields extend over more than 125,000 square miles of territory. The fact Mr. Ogilvie is known to be most conservative in all his estimates, and not at all given to speculation and romance, gives additional weight to his assertions. Other precious metals are to be found in the same district; there is also coal, petroleum, and other products, awaiting only the means of securing and transporting to market. A system of thawing the frost-bound ground in winter, by the aid of electricity, is now said to be being experimented on in the gold fields.

A SPECIAL dispatch to *The Daily Mail* from Cape Town says that a meteor, that is described as being half the size of St. Paul's Cathedral, has fallen at Port Alfred. It made a hole in the ground 50 feet deep, 120 feet long, and 60 feet wide.

A NOVEL WINDOW RAISING AND LOCKING DEVICE.

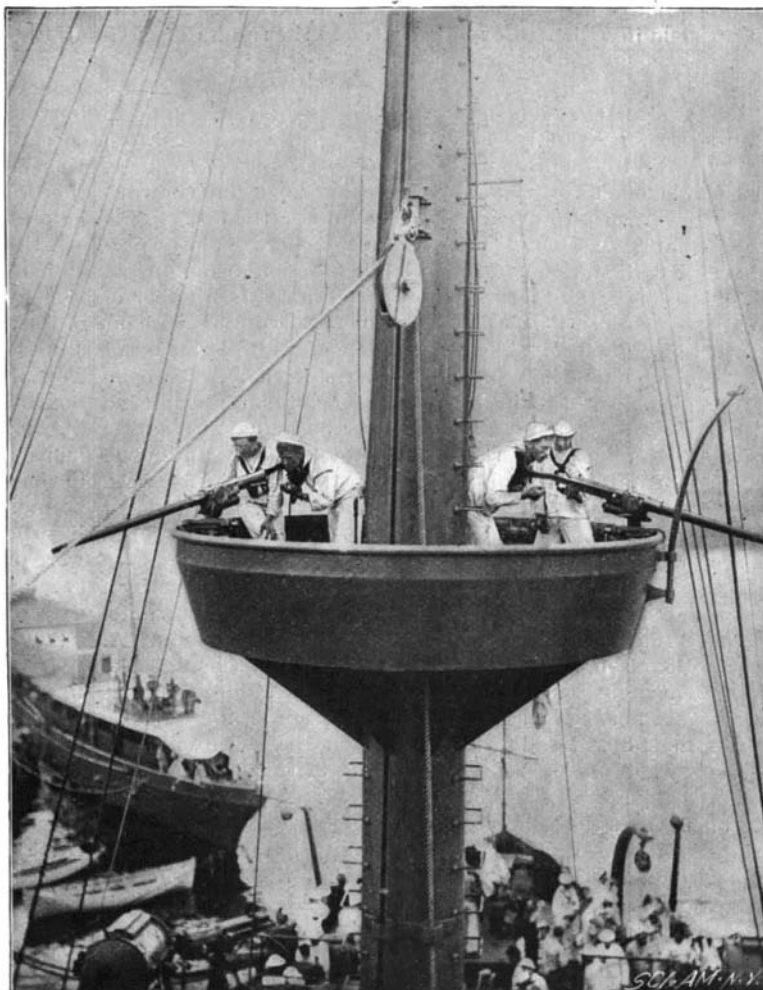
The device illustrated in the accompanying engraving embodies simple mechanism for raising and locking a window sash. The mechanism in question consists of a spring-motor that will be automatically wound or set by a downward movement of the sash, the usual weights being discarded.

The illustration represents the mechanism in par-



BRUNO'S WINDOW RAISING AND LOCKING DEVICE.

tial section as applied to a window sash and frame. It will be observed that the device comprises a rack on the window sash, which rack is engaged by a spring-operated gear-wheel mounted in a frame. The gear-wheel is held in engagement with the rack by means of the spring shown. When it is desired to increase the tension of the spring, the shaft of the gear-wheel is rotated in one direction, a dog preventing the backward movement of the wheel. When it is desired to decrease the tension of the spring, the frame in which the gear-wheel is mounted is swung aside on the pivot on which it is hung, so that the teeth of the wheel are disengaged from the rack; in this position the dog is lifted and the tension of the spring lowered to the required degree. A holding and locking device for the gear-wheel is provided, consisting of a slide-pin operated by a removable key, as shown in the illustration.



FORWARD FIGHTING-TOP OF THE "TEXAS."

As indicated in the figure, raising and lowering devices are arranged one on each side of the window.

When it is desired to raise the sash, the holding pins are moved out of engagement with the gear-wheel by means of the key. When the gear-wheels are thus released, the springs operate to rotate the wheels, the movement being communicated to the window sash by means of the racks. By permitting the holding pins to fall back

into engagement with the teeth of the wheels, the sash may be locked in any desired position. It is evident that when moved downwardly the sash, by means of the racks, will operate the gear-wheel to wind up the spring and place the mechanism in adjustment for raising the window again.

The device has been patented by the inventor, Frans Bruno, of 78 Herkimer Street, Brooklyn, N. Y.

RETURN OF THE VICTORIOUS FLEET FROM CUBA.

Saturday, August 20, was a red-letter day in the history of New York city, for when the seven armored warships of Admiral Sampson's fleet, fresh from the smoke of battle and bearing the scars of a victorious struggle, steamed in stately line up the North River, New Yorkers gazed upon a sight the like of which no city has ever witnessed before.

True, there have been other naval parades signaling the close of successful wars. Victors in even greater numbers had dressed ship, and bells had swung and trumpets blared at triumphal naval parades long before the Dutch founders of New York set foot upon Manhattan Island. But never before has such a fleet of armored battleships and cruisers, representing the latest ideas of warship construction, come home to parade in triumph with the scars of a victorious struggle fresh upon it.

Immediately after the signing of the Peace Protocol orders were given for the battleships and cruisers of Sampson's squadron to come north to be docked and overhauled at the Brooklyn navy yard.

In agreement with a popular wish, while the ships were coming up the coast, instructions were given for the fleet to parade from Tompkinsville, on its arrival at New York, up the North River to Grant's tomb and return. The instructions to this effect were delivered to the incoming fleet as it was working its way up the Jersey coast in the gray dawn of the morning. The photograph showing the flagship "New York" with the other vessels astern was taken while approaching the "New York" at 5 A. M. by our artist on the government boat "Nina." The dispatches were handed aboard, and by the time the fleet reached Staten Island, the ships were in trim for the parade, and the crews, dressed in their picturesque white duck, were formed up on the upper decks and superstructures in the picturesque grouping shown in the illustrations.

The flagship "New York," with Admiral Sampson on board, led the way. The sight of this handsome vessel, whose outline is perhaps the most familiar to the public of all the ships of the navy, recalled the many incidents of the war in which she has figured: The blockade of Havana, the bombardment of Matanzas, the cruise to Porto Rico, ending in the attack on San Juan, in which she was struck by a shell and one of her seamen killed, and finally her long stern chase at Santiago, where the chances of war had decreed that she should only be "in at the death," missing the great fight that preceded it.

A few hundred yards astern loomed up the "Iowa," bigger than the "New York" (8,200 tons) by 3,140 tons, and looking especially formidable with her lofty spar deck and its forward 12-inch guns, carried 26 feet above the water line. The "Iowa" bore the marks of the San Juan and Santiago engagements. Forward on the starboard bow two square patches of plate showed where a couple of big shells had entered when the "Iowa" was exposed to the first rush of Cervera's fleet at Santiago. A score of holes on the berth deck show where the flying fragments of one of the shells tore through the tough steel plating. On the spar deck, holes big and little testify to the slaughter which another bursting shell would have caused among the 6-pounder batteries had the men not been sent below decks during the San Juan bombardment.

Next came the "Indiana," one of the famous trio of which the "Oregon" is just now the most popular member. She lay to the eastward of the harbor when the Spanish fleet came out, and it was only the unfortunate fact that her boilers were in trouble that prevented her from joining in the chase.

Although not the largest in displacement, the "Brooklyn," with her lofty bow, towering smokestacks, and great length, was, perhaps, the most impressive vessel in the fleet. The comparative inaction of this vessel in the earlier stages of the war was more

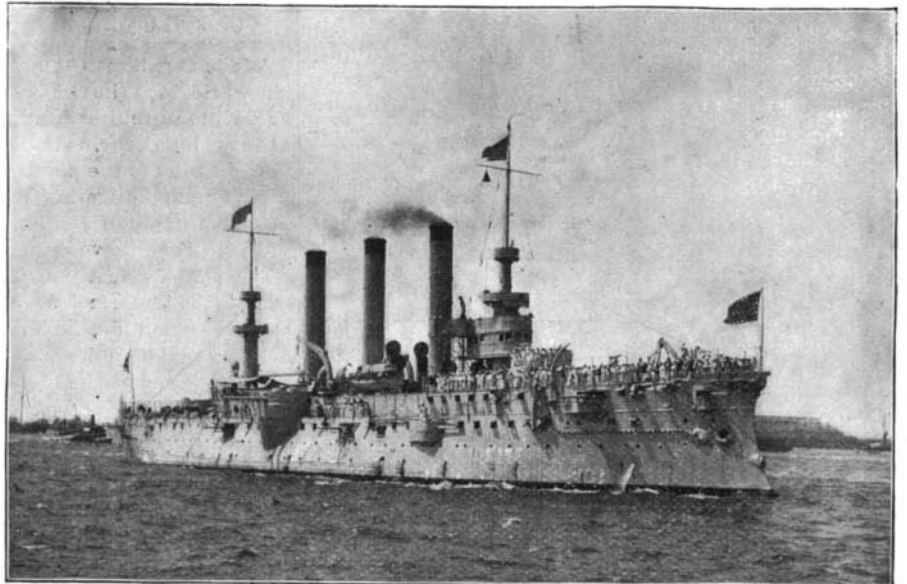
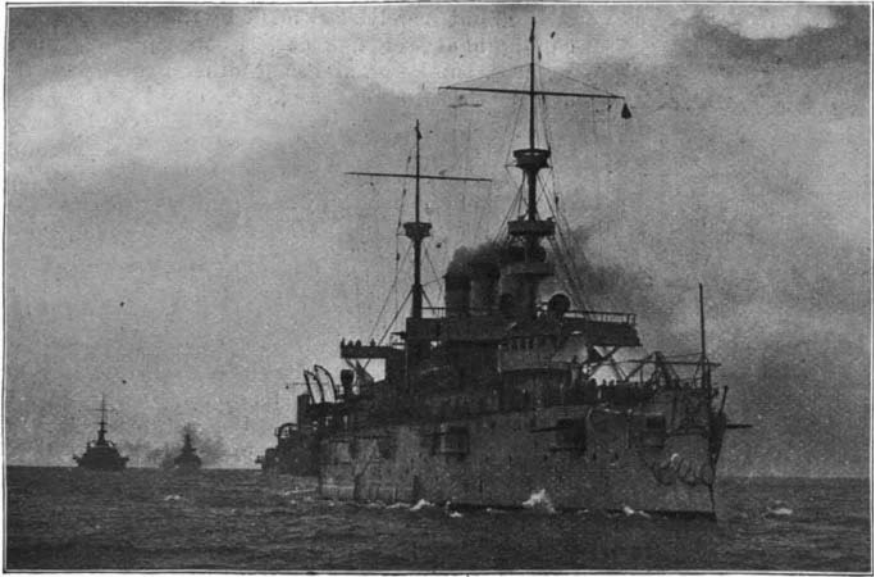
than atoned for in the splendid opportunity which she was given in the Santiago fight. When the Spanish fleet headed for the west, the "Brooklyn" was the only vessel that lay directly in their path. They were all headed directly for her (the captured Spaniards say with the intention of crippling her by their concentrated fire, and so escaping from the slower battle ships). As the "Vizcaya" drew near, the "Brooklyn"

swung out in a wide turn to sea and then took up the chase in company with the "Oregon." She carried more of the scars of conflict than any other vessel in the fleet, having been struck some thirty-six times. Most of her hits were received in the long range duel

which she fought with the "Christobal Colon" during the latter's 48-mile dash for liberty.

Astern of the "Brooklyn" came the "Massachusetts," looking uncommonly weatherstained, and therefore very much like a warrior just in from hard service.

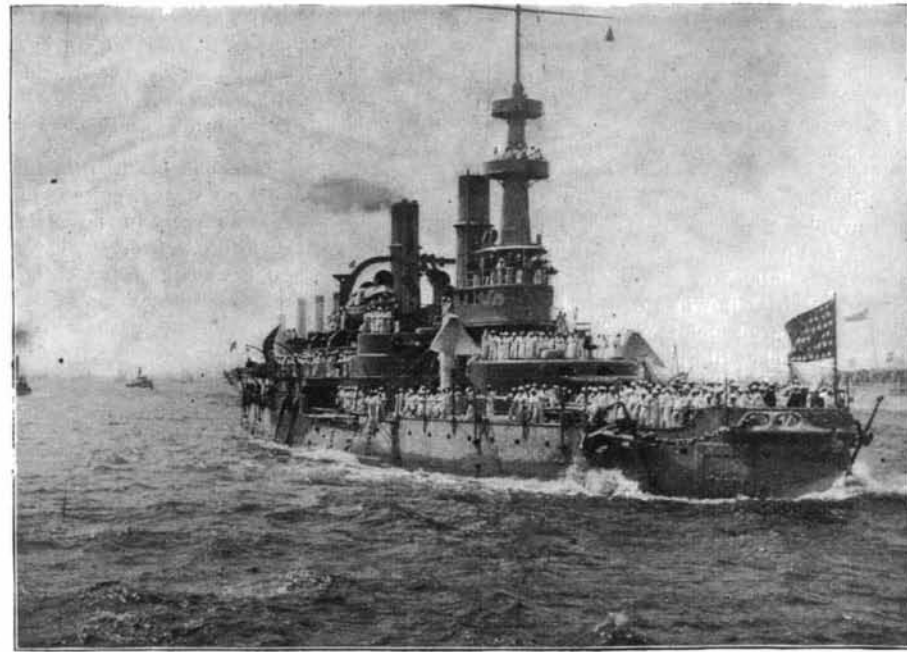
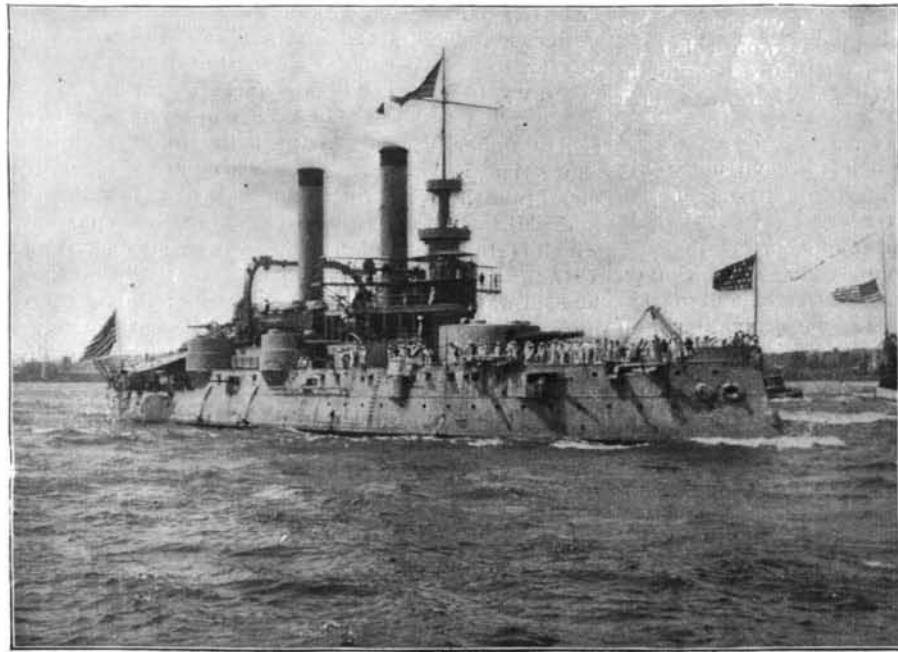
The "Massachusetts," like the "New York," had the misfortune to be absent from her station when the battle of Santiago took place. She was coaling several miles down the coast at the eventful hour for which, during many a long day and night, her ship's company



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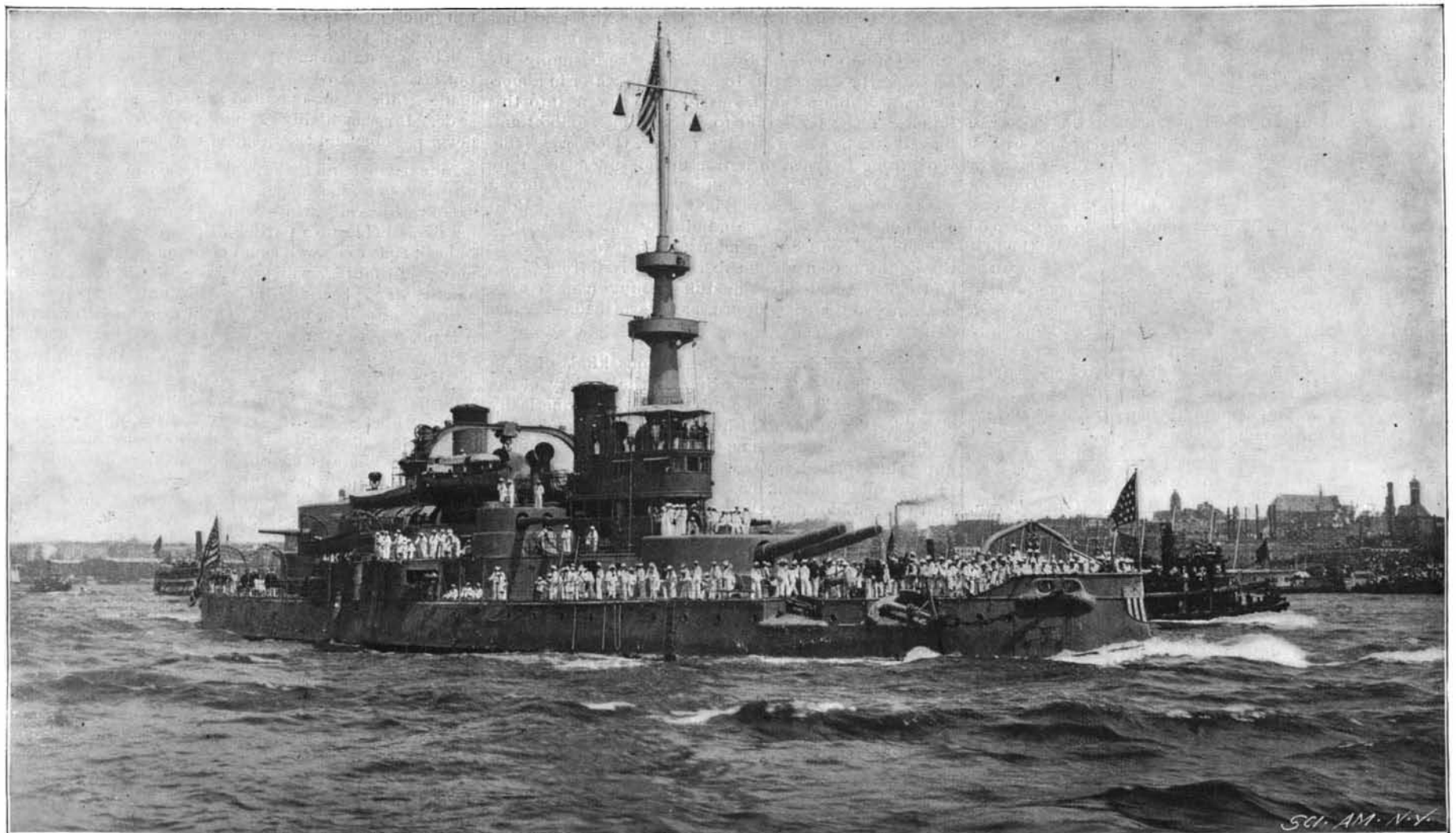
Armored Cruiser "New York" (Flagship). Leading the Squadron up the Jersey Coast.

Armored Cruiser "Brooklyn."



Sea-going Battleship "Iowa."

Battleship "Indiana."



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Battleship "Oregon."
RETURN OF THE VICTORIOUS SQUADRON FROM CUBA.

had impatiently waited. The chances of war were largely answerable for the fact that the "Massachusetts" was not so much in the public mind as some other ships that steamed by the applauding thousands that thronged every vantage point on each side of the river.

The great similarity between the "Indiana," "Massachusetts," and the "Oregon," and the impossibility of the average spectator identifying the Pacific coast vessel, was all that prevented the "Oregon" from receiving a special ovation from the multitude. She followed the "Massachusetts," and her freshly painted hull, with a brilliant coat-of-arms conspicuous at her bow, had covered up all suggestions of that 14,000-mile journey round "the Horn" and the death-dealing blows this splendid ship had dealt at Santiago. Remarkable to relate, the "Oregon" has less marks to show for the war than any other ship. She is practically unscathed, and proves again the old truth that the best protection to a ship is a crushing fire delivered by her own guns. The excellent performance of the "Oregon" was due to rigid discipline, careful and continual inspection, and the fact that everything in the ship was at all times tuned up to concert pitch. We have just learned from one of her officers an interesting fact regarding the speed shown by the "Oregon" at Santiago. It seems that some of the blockading vessels were repairing their boilers, one at a time, keeping the fires banked in the other three. At the earnest request of the chief engineer of the "Oregon," fires were kept going under all four of her boilers, the chief having declared that they were in sufficiently good repair to stand a few hours pressing under forced draught. A day or two later the Spanish fleet made its attempt, and the "Oregon" was able to pass through our fleet with all boilers going and the forced draught in full swing. During the last half hour of the chase she was running well up to her trial speed.

Last in the procession was the second-class battleship "Texas." Not much over half the size of the "Iowa," and representing an earlier day in battleship design, she has won laurels in the war second to none. This vessel does not appear in our illustrations, as we have recently shown and described her at considerable length in our issue of August 20.

The vessels will all be docked in the new dry dock, known as No. 3, at the Brooklyn navy yard, which is about to be opened after the long months of work that were necessary to repair the leaks which appeared shortly after it was turned over by the contractors.

France to Represent in Maneuver the Operations Around Santiago.

France will be the first country to repeat in naval maneuvers some of the problems lately solved by the navy of the United States. M. Lockroy, the Minister of Marine, will go to Brest in order to be present at the series of important maneuvers carried on by a combined naval and land force. The naval force will include the entire north fleet; the land forces, placed under the command of Gen. Dodds, will be composed of the Second Brigade of Marine Infantry, the batteries of the Second Regiment of Marine Artillery, stationed at Brest, a battery of field artillery, and a battalion of infantry. The militia of the port will co-operate in the maneuvers. The operations will be of two kinds—operations by sea and operations against the land, with tentative landing at a given point on shore. The port of Brest, situated at the end of a deep bay, is in a certain way analogous to Santiago de Cuba. The aim of the maneuvers will be, in the first place, to develop the problems presented before the Cuban port, and, in the second, to test the impregnability of the port of Brest against attacks made by sea and land. Similar operations will be carried on before Cherbourg toward the end of the month. The situation of the neighboring island of Cotentin offers great facilities for the landing of troops covered by the fire of the warships, and communication with the military port of La Manche can be easily cut off.

Telephones in Cape Colony.

Consul-General Stowe writes from Cape Town, April 25, 1898: The telephone service of Cape Colony is under the control of the colonial government. On April 9, 1898, there were 1,535 instruments in use, and the revenue for 1897 amounted to \$66,137.22. There are 869 miles of wire and 780 subscribers. Seven exchanges in the colony work on the single-wire system, but arrangements are being made to have all lines duplicated, and in future no exchange will be established except on the metallic-circuit system. In the course of the next few months the underground cable system in Cape Town will be completed and exchanges established in the suburbs.

IN various foreign countries, including Holland, Belgium, Italy, and Germany, and in fifteen of the United States of America, the law permits the sale of oil of a flash-point of 73° and under, and there are other States in America which have flash-points considerably higher.

Miscellaneous Notes and Receipts.

A waterproof coating for carriage covering cloths is produced by dissolving 50 parts gelatine in 75 parts glycerine and 150 parts water and adding ½ part salicylic acid dissolved in alcohol. The mass is heated before use and 15 parts potassium chromate added to it.—Cesky Lloyd.

White Sapphires.—Among the most beautiful gems of the world, says the Gold und Silberwaren Industrie, are the white sapphires from Ceylon, for sapphires are not always blue, their shades varying from the darkest velvety blue to the palest shades of this color, which finally pass altogether into white. White sapphires often show blue stripes, others appear white when viewed from above, but look bluish when held sideways against the light. Even green and yellow tints occur. The former are known under the name of Oriental emeralds, the latter as Oriental topazes. There are also red sapphires or Ceylon rubies, which are fully as high priced as the best Binnarubies.

Speaking Clocks.—In Switzerland they have commenced making phonographic clocks and watches which, it appears, leave anything heretofore accomplished far in the shade. By merely pressing the button of the new timepiece, it pronounces the hour distinctly. The alarms call to the sleeper: "It's six o'clock; get up." There are some which even add the words: "Now, don't go to sleep again." The form can be changed to suit the buyer and make the warning more or less emphatic. This application of the phonographic principle is due to a French watch maker settled at Geneva. He introduces into clocks and watches little slabs of vulcanized rubber, on which the desired words are traced in grooves corresponding to the hours and fractions of hours.—Le Moniteur de la Bijouterie et de l'Horlogerie.

Gouache Colors.—Gouache colors are virtually only opaque water colors and differ from the aquarelle colors merely in that the latter are glazing. Strictly speaking, our size colors are also gouache colors. The gouache colors are chiefly employed for painting on fans, parchment articles, cigar cases, etc., and also in conjunction with aquarelle colors for making and painting sketches. An excellent paint for the last named purpose is prepared as follows: Soak fine zinc white and good white chalk (one-half of each) in water, pour off the supernatant water and add a few drops of dissolved gum arabic, but only enough to bind the color and impart to it a very faint gloss. By the addition of aquarelle colors to this white, different shades can readily be mixed. This very cheap and useful gouache white (body white) has been found very serviceable in practice.—Deutsche Maler Zeitung.

New Chinese Dye Stuff.—The French scientist Picquet reports on two new Chinese dye stuffs, the Cu-nao and the Cayda. The Cu-nao is a bulb weighing 1 to 2 pounds and in some points resembling our potato. It is much used by the Tonkinese and has woody meat, which looks like dried red beets. Dyeing with Cu-nao is done by the Tonkinese simply by crushing the fresh fruits together with water in a mortar and dipping the goods to be colored into this liquor. The color is said to be very fast to light and durable. The other coloring matter, the Cayda, is derived from the bark of a tree and is chiefly used by the Anamites. They comminute the bark into a coarse grained powder and boil it out in water. Both substances are said to be admirably adapted for dyeing and to produce very handsome brown shades. By the addition of a viscid substance derived from China and called Pheu-deu, the stuffs assume a glossy appearance, so that they appear as if varnished.—Färben Zeitung.

Benzine Varnish and Polish.—Various kinds of resin are carefully melted, according to the variety of the varnish or polish to be produced, in hermetically closed kettles under addition of boracic acid and, after cooling, moistened with methylic alcohol. The liquid gums thus treated, says the Chemiker Zeitung, are completely soluble in benzine. The following gums enter into use: White or yellow shellac, sandarac, mastic, Manila gum lac, stick lac, etc., either alone or mixed together, according to whether the polish and varnish is to be light colored, yellow, or red, dull, or transparent. The percentage of boracic acid, gum, and methylic alcohol varies according to the quality of the resins employed and the destination of the varnish and polish, but in no case must the quantity of boracic acid exceed 5 per cent of the resin quantity employed, and the proportion of methylic alcohol should not, even in case the hardest and most scarcely fusible gums are employed, make up more than the weight of the resin amounts to. The contents of solid substances in the varnishes should not be less than 15 per cent and not less than 8 per cent in the polishes. According to the inventor, the benzine varnishes can not only entirely take the place of the spirit lacquers and polishes, but even afford the advantage of facilitating and accelerating the work, on account of the quicker evaporation of the benzine.

Science Notes.

Seventeen parcels of ants' eggs from Russia, weighing 550 pounds, were sold in Berlin recently for 20 cents a pound.

Experiments with plant seeds subjected to extreme cold have shown that the power of germination is not destroyed but merely suspended by the cold. By the use of liquid air, seeds of barley, oats, squash, cucumber, pease, sunflower, and some other plants were recently kept for 110 hours at a cold of -183° to -192° Centigrade. They were then carefully and slowly thawed for fifty hours. They were then planted, and sprouted as well as if they had not been frozen. The experiments were made by Messrs. Browne, Escombe, and Horan, in London.

A method of determining simultaneously the electric and thermic conductivities of metals at different temperatures is outlined by Straneo. A series of experiments were undertaken to ascertain, if possible, exactly how the thermic conductivity of a substance varied with the temperature. It was found that, as regards the internal conductivity, the variations were too fine to be definitely determined by any of the existing methods. The coefficient of surface conductivity increases with the temperature, however, and the dispersivity not only increases with the absolute temperature, like the coefficient of specific heat, but is at least a quadratic function of the difference of temperature between the body and the surrounding air.

Recent researches on metallic lithium have shown that this metal cannot be distilled in either hydrogen or nitrogen gases, vigorous combination occurring in both cases. The metals of the alkaline earths would appear to behave similarly; so that if it should be necessary to heat these substances in an indifferent gas, argon or helium must be employed. In a recent number of the Comptes Rendus, M. Moissan shows that, if pure calcium be heated in hydrogen, the metal takes fire and burns energetically, forming the hydride CaH_2 , a transparent crystalline substance which is stable at a high temperature. It behaves as a strong reducing agent, and is violently decomposed by cold water, giving off one-seventh of its weight of pure hydrogen gas. It differs from the corresponding lithium hydride in that nitrogen is without action upon it at a red heat.

At a time when the relative advantages of steam and electricity as a motive power for railways are being greatly discussed, a method of propulsion which dispenses with either is certainly of interest. Recently has been invented in England a railway in which the sole power is gravity, assisted by hydraulic rams. It consists of sections, the rails being raised on columns, and the trains or cars are suspended on either side below them. At the junctions the sections are hinged together, and at three points can be raised by hydraulic rams. The raising of the track with the trains upon it forms a grade down which the cars rush to the next rail junction, when the same process is repeated, and so on, until the terminus is reached. A model plant has been installed and is now on exhibition in London but it remains to be proved that the scheme can be made available or operated economically on a large scale. It seems highly probable, however, that it will never pass beyond the range of novelty.

Among the garden plants commonly in vogue which possess a poisonous nature botanists mention the flowers of the jonquil, white hyacinth, and snowdrop, the narcissus being also particularly deadly, so much so, indeed, that to chew a small scrap of one of the bulbs may result fatally, while the juice of the leaves is an emetic. The berries of the yew have killed many persons, and it is pretty well known nowadays that it is not safe to eat many peach pits or cherry kernels at once. The lobelias are all dangerous, their juice, if swallowed, producing vomiting and giddiness, with pains in the head. Lady's slipper poisons in the same manner as does poison ivy. The bulbs seem to be the most harmful. Lilies of the valley are also as much so. There is enough opium in red poppies to do mischief; and the autumn crocus, if the blossoms are chewed, causes vomiting and purging. The leaves and flowers of the oleander are deadly, and the bark of the catalpa tree is very mischievous; the water dropwort, when not in flower, resembles celery, and is virulent.

Philanthropists Profiting by their Philanthropy.

From Trenton, N. J., comes the news that a local gas company has decided to distribute gratis two thousand gas ranges. At first blush, it may seem as if the Jersey gas companies were becoming philanthropic, but after a moment's thought the purpose of our Trenton friends becomes apparent. Everybody likes to get something for nothing, but it unfortunately happens that a gas range, in order to be of service, must consume gas. If the citizens of Trenton are inclined to use their easily acquired ranges, the profits of the company will increase considerably and several new gasometers will have to be erected to meet the increased demand for gas.