A CHARACTERISTIC GROUP AT THE BROOKLYN NAVY YARD.

(Continued from first page.)

way of weather is obvious. In addition to the ships mentioned, our view of the navy yard includes the "Cincinnati," seen astern of the "New York," and the composite gunboat "Newport," both of them fine seaworthy boats, sitting well up out of the water and capable of fighting anywhere and at any time that the country calls for them.

Another improvement that characterizes all of these ships is the possession of a numerous rapid-fire battery. Such is the speed of fire and the all-round superiority of the rapid-fire over the old slow-fire type of gun that no ship can be considered thoroughly up-to-date which does not include these weapons as a part of its armament. Other things being equal, the effectiveness of a gun is directly proportional to the rapidity with which it can be loaded, sighted and fired; and as the rapid-fire gun can deliver from four to six times as many shells in a given time as one of the slow-fire type, it is evidently, as far as its offensive powers are concerned, just that much more efficient.

The "San Francisco," a 4,098-ton ship, carries a main battery of twelve 6-inch slow-fire guns, and the "Cincinnati," of 3,213 tons, is armed with one 6-inch slow-fire and ten 5-inch rapid-fire guns. During one minute's firing the former could deliver from twelve to eighteen shells, capable of penetrating fourteen inches of iron at the muzzle, whereas the smaller boat in the same time could discharge from her rapid-fire guns alone from fifty to seventy shells, each capable of penetrating about the same thickness of iron as the 6-inch shells of the "San Francisco." Provide the two ships with gunners of equal skill and pit them against each other in a naval duel, and the victory will rest with the smaller ship.

The speed of the rapid-fire gun is due to the fact that the shell and the charge are put up in a metallic cartridge, thus doing away with the need for sponging after each discharge, and also enabling the loading to be done in one operation. The breech mechanism is so arranged that the act of opening the breech starts the empty cartridge shell, enabling it to be easily withdrawn by hand. A further and important gain in speed is realized by attaching the sights to the stationary gun carriage instead of to the gun, and permitting the gun to recoil independently of the sights. By this arrangement the gun, when it returns automatically to the firing position, lies on the same point on which the gunner last sighted it, the training and elevation being unchanged by the discharge. If the object of attack is stationary, no change in the sighting is necessary when once the range has been found, and if the object is moving, as in the case of a ship, all the gunner has to do is to make the slight change in the sighting required by the change in position that takes place in the ten seconds interval between each discharge.

Of the ships shown in the illustration, the "Iowa" carries as part of her main battery six, the "Newport" six, and the "New York" twelve 4-inch rapid-fire guns. The "Brooklyn" supplements her powerful 8-inch rifles with a broadside battery of twelve 5-inch guns, and the little "Cincinnati," though but one-third the size of the armored cruiser, carries ten of the same rapid-fire weapons in broadside.

Crystallization of Salts.

J. Leadbeater gives instructions for the crystallization of salts on glass slides which should be useful to anyone who requires preparations for the lantern or micro-polariscope. Such salts as barium nitrate, potassium chlorate and oxalate, microcosmic salt, sodium oxalate and nitrate, zinc or copper acetate, iron sulphate and uranium nitrate should be dissolved in hot water to make saturated solutions, and the addition of a little sugar tends to fix the crystals more firmly to the slides. For lantern slides, beer may be used as a solvent instead of water and the sugar can then be omitted. Phthalic acid, benzoic acid and other compounds insoluble in water must be dissolved in alcohol. The glass plates must be perfectly clean, and the solutions may either be applied with a camel hair brush or poured on in the same way as collodion when used to coat photographic plates. After draining slightly, lay the slides perfectly flat for crystallization to take place, taking care, of course, to protect them from dust. Photo engravings representing slides of potassium ferrocyanide and ferricyanide, ammonium chloride, magnesium sulphate, and borax illustrate the paper, and show that the process, by which presumably the slides have been prepared, recommended yields satisfactory results.—Spatula, iv., ii.

SHETLAND hose is known to excel in the unusual fineness of the wool used for it, which is furnished by the lean Shetland sheep. As is reported by Chambers's Journal, the wool of this animal, which is thriving in a comparatively raw climate under scanty conditions, is not obtained by means of shearing, but by plucking, which is said to be harmless as far as the animal is concerned.

Electrical News and Notes.

In consequence of a telephone wire falling upon the overhead wires of the electric street tramways at Zurich, Switzerland, the central station of the telephonic service, which has 5,000 subscribers, caught fire and was completely destroyed.

The Telephone Replacing the Telegraph.—The Pan Handle Railway is putting in telephones at points where improvements are in progress, and in this way furnishing a means for facilitating the movement of trains without the expense of telegraph operators, which has been the custom heretofore. This is only one of many cases in which the telephone is crowding out the telegraph, and we may expect many more such.

Chicago Electric.—Chicago has at present some 1,248 fire alarm boxes, 1,294 police telephone boxes, 2,700 miles of overhead and 860 miles of underground wire, a municipal lighting system, including 1,460 arc lamps of 2,000 candle power and three large electric light plants. The city also contains private plants to the number of 400, and a vast quantity of wire, poles, street cars and other apparatus employed in the production and use of electricity.

Electrical Production of Phosphorus and Calcium Carbide.—Dr. Borchers, in a recent number of the Zeitschrift für Elektrochemie, reviews a new process for winning phosphorus and calcium carbide from Thomas slag. In this process tricalcium phosphate is mixed with an excess of powdered carbon, and heated in an electric furnace, whereby calcium carbide, phosphorus and carbonic oxide are formed. The phosphorus passes over into the condenser and is recovered, the yield being claimed to be 80 per cent of the theoretical. Dr. Borchers describes a series of experiments made by himself with a view of converting the phosphates of these slags into phosphides, the latter to serve as a deoxidizing material for overblown iron. The results, however, proved negative, the lime in the slag giving off its phosphorus and going into calcium carbide.

Wireless Telegraphy.—The Marconi wireless telegraphy boom seems to have petered out, says a cablegram of The New York Sun, and the syndicate which kept it going for over a year has arrived at the conclusion that there is no money in it. The fact is, the commercial aspect of this interesting subject led to a fuss long before the improved handling of the old discovery had got beyond the laboratory stage. Big brains are now working upon it, and, in due course, a practical method of utilizing the discovery will probably be forthcoming. Prof. Oliver Lodge, for instance, says he has an entirely new method of telegraphing without wires which will, he hopes, enable him to send messages long distances. He does not depend upon waves, but upon magnetism, which is independent of obstacles; and he believes it will be applicable to signaling between ships and between the shore and ships. Prof. Lodge's ideas are not for sale to any syndicate.

Municipal ownership of electric light and power is in operation in the following cities of Germany, which own and manage the works, says Engineering News: Bremen, Barmen, Cassel, Darmstadt, Dusseldorf, Elberfeld, Hanover, Cologne, Konigsberg, Lubeck and Pforsheim. Except Hanover, all these cities also own the gas works. Aix la Chapelle, Chemnitz, Frankfort, Strasburg and Stuttgart have all built their own electric works, but lease them for operating to private corporations; and, with the exception of Chemnitz, the gas works are also managed by private companies. In the following cities private corporations have built electric works, with the understanding that the cities can purchase them under certain conditions: Altona, Dessau, Gera, Hagen, Heilbronn, Leipsic, Mulhausen, Stettin and Zwickau. The gas works are owned by private companies in Dessau, Hagen, Mulhausen and Zwickau.

A Use for Electric Light Carbon Ends.—At last a use has been found for the unburnt ends of carbon taken from electric arc lamps. Mr. Johnston, the foreman of the smiths' and woodworking shops of the Baldwin Locomotive Works, in Philadelphia, has recently instructed the man who changes these carbons in the lamps throughout the works to save the partly consumed pieces and bring them to him daily. He gets in this way some sixty or seventy carbon stumps, which he utilizes for making a small charcoal fire of great heat and purity, suitable for any kind of special small work not interfered with by the copper coating on the outside of the carbons. Mr. Johnston having shown the way, others engaged in kindred lines of work ought to follow his example. It stands to reason that carbon prepared with so much pains to keep it pure and homogeneous must be serviceable for some of the many uses for which charcoal is required. The copper coating might be an objection for some things, but if the collections of stumps were large enough, it might pay to remove the copper with nitric or sulphuric acid, thus getting an absolutely pure nitrate or sulphate of copper, for either of which there is always a practically unlimited demand in the arts.—Cassier's Magazine.

Science Notes.

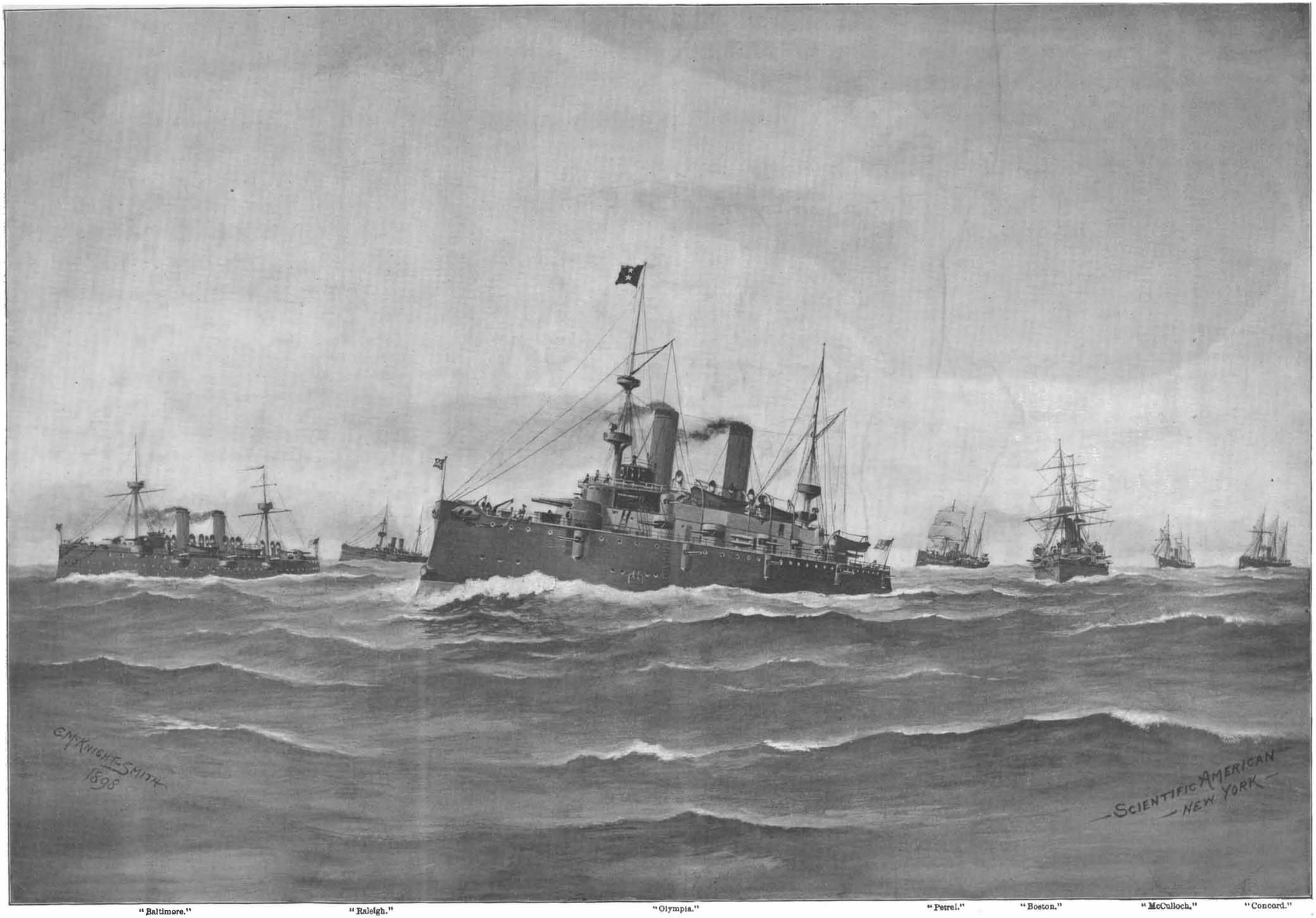
Science is continually discovering new wonders. An artesian well driven at San Marcos, Texas, recently found not only water, but a kind of animal inhabiting the water, which is found nowhere else. Specimens have just been received for study at Cornell University. The creature proves to be a blind salamander, nearly white in color, with long slender legs and toes useless for locomotion, but valuable for feeling in the blind darkness of the underground waters. They have been given the graceful name of Typhlomolge.

Prof. S. H. Vines, some years ago, showed an important analogy between the pitchers of Nepenthes sp. and the gastric mucous membrane of animals, by preparing from the secreting areas of the pitcher wall a glycerin extract which had a distinct digestive action on fibrin. This appeared to indicate the formation of a zymogen in the cells and its subsequent decomposition by the action of acids. Later observers having denied the presence of an active ferment, while declaring that the disappearance of proteid matter placed in the pitchers is merely a putrefaction set up by bacteria, Prof. Vines brings forward additional evidence which confirms his original conclusion, that an active digestive process is set up in the pitcher by a proteolytic ferment formed in the gland cells of the walls. In one experiment digestion was set up by a glycerin extract of the pitcher in a solution containing one per cent of prussic acid, and it is asked what organism can digest fibrin in such a solution or retain its digestive activity when kept for several weeks in pure glycerin, as must have happened in some of the experiments had any such organisms been actually present.—Annals of Botany.

Prof. Richards, of Harvard University, has for some time been at work on a revision of the atomic weights of nickel and cobalt. These weights form an apparent exception to Mendeleeff's law, as one would expect the atomic weight of nickel to be the greater instead of being the less, as it really is. It has been supposed that the discrepancy was due to impurities in the metals used by previous experimenters, and Prof. Krüss imagined that he had isolated a new metal—gnomium; but its existence has never been confirmed. Prof. Richards has used great care in purifying his material, and has used in both cases a bromide of the metal for analysis. He finds the atomic weight of nickel to be 58·69, and that of cobalt 58·99, thus confirming previous observations as to the anomalous order of these elements in the periodic system. No explanation can yet be given. Prof. Richards is testing his results by the use of other compounds than the bromide.

A service has been done to women generally by Dr. G. A. Wood, of Chicago, in tests made by him with systematic care to determine the danger, if any, in the wearing of veils. For this purpose he selected a dozen typical specimens of the article and applied the ordinary tests of ability to read while wearing them; and these tests show that every description of veil affects more or less the ability to see distinctly, both in the distance and near at hand, the most objectionable being the dotted sort. Other things being equal, vision is interfered with in direct proportion to the number of meshes per square inch, and the texture of the material also plays an important part in the matter. Thus, when the sides of the mesh are single, compact threads, the eye is much less embarrassed than when double threads are used, the least objectionable veil, on the whole, being that which is without dots, sprays or other figures, but with large and regular meshes made with single and compact threads. Dr. Wood pertinently remarks that, while eye troubles do not necessarily result from wearing veils—for the healthy eye is as able as any other part of the body to resist legitimate strain—weak eyes are injured by them.

J. O. Schlotterbeck and A. Van Zwaluwenburg have undertaken the comparison of the structure of the leaves of Datura stramonium, Atropa belladonna and Hyoscyamus niger, in the hope of determining their characteristic features, so as to help in their identification in the form of fine powder. Unbroken dried leaves when very brittle were soaked in 50 per cent alcohol and then spread out, while before cutting sections they were transferred to 96 per cent alcohol. The sections were mounted in chloral hydrate solution, which acts as a clearing fluid. Stramonium leaves appeared smooth, sinuate, unequal at the base, with round perforations, and a prominent midrib underneath; the belladonna leaves were broadly ovate, narrowed into a petiole, and the entire margin is smooth; hyoscyamus leaves were hirsute, deeply sinuous, and clasping at the base. The dry powders from the leaves were mounted in chloral hydrate solution direct. The stramonium powder contained elongated palisade-cells, stellate crystals, a few cubes, and thick-walled, warty hairs; belladonna powder contained large round crystal cells, full of crystal sand or acicular crystals; while hyoscyamus powder contained prismatic crystals and occasionally some stellate ones.—Pharm. Archives.



"Baltimore." "Raleigh." "Olympia." "Petrel." "Boston." "McCulloch." "Concord."

THE ASIATIC SQUADRON ON THE WAY FROM HONG KONG TO MANILA.