Indian Funeral Trees.

A remarkable specimen of the red cedar was recently unearthed by the opening of the Metzgar Indian Mound, on Deer Creek, near Yellow Bud, in Ohio. A large bed of ashes, a quarter of an inch in thickness, covered a space of about ten feet by six. Near the edge of this ash bed a large log was found. It was about five and a quarter feet in circumference, and as sound as if buried but a few years ago. The side branches had been cut away from the log, and one of the scars was so perfect that the marks of the stone axes used in the work are plainly discernible. There are no cedar trees now growing nearer than ten miles from that immediate neighborhood, and none were there growing when the early settlers came, so that the trees must have disappeared from there long ago in the past, or the improbable alternative accepted that the log was brought from a long distance. Evidence was furnished that the log was originally about eighteen feet long. Right beneath the log was a skeleton of a human being. A small pen had been made of small cedar saplings, arranged in the form of a tepee around the large log. The skeleton was about two feet below the original surface of the ground, and the earth forming the mound over the skeleton had a depth of about thirty-four feet from the summit. The earth to form the mound had evidently been brought in baskets by manual labor, as the "dumps" in some cases, formed by different tinted materials, could be distinctly seen. The circumstances favorable to the preservation of the cedar log had evidently aided in preserving the skeleton, and it is possible the size of the log had some relation to a distinguished personage. The body had been laid straight under the log, with legs extended and arms at the sides. Around each wrist were two bracelets, made of native copper, and several hundred shell beads were around the neck and on the chest. It is believed that the dry ashes with which the body had been covered, in addition to the great depth from the surface, had aided in preserving the log as well as the human remains. Even traces of hair were found around the skull, as well as dried and shriveled portions of the brain were found, while rude cloth and matting, as well as buckskin, put over the corpse before the ashes, were in a fair state of preservation. As the use of the cedar log would seem to have been a matter of choice, it opens a new field for speculation as to the possibility of the tree having had some special significance in the funeral ceremonies of the Mound Builders. A section of the log has been secured for the museum of the Academy of Natural Sciences, of Philadelphia—the exploration, indeed, having been made under the auspices of that body.

Painting Carriage Bodies.

Here is what an experienced man writes in Varnish:

My subject is white lead. I have been experimenting with it for some time, and am fully convinced that it should be used very sparingly in the painting of a carriage body, and more especially as a putty. You naturally ask why?

What is white lead? It is a corroded metal, which is capable of being brought back to its original state, but with a loss of its weight, thus proving that it has not lost its metallic property of expansion and contraction.

How can we prove this? Let us make a white lead putty taper two inches long, one and a half inches at the large end and one inch at the small end. Let it get perfectly dry, then have it turned accurately and fit a brass ring to the large end when the putty is at a temperature of 30 degrees. Then raise it to 90 degrees and attempt to pass it through the ring. You will find that you cannot do it, thus proving that white lead putty expands at no uncommon change of temperature.

What are its adhesive qualities? Very little in itself. It is unlike glue or other resinous substance, which penetrates the fiber of the wood and in a manner clinches itself, but like the brick to the mortar, is held by absorption.

How can we prove this? Paint a thin board with three coats of white lead mixed with oil and turpentine (or brick is still better). When perfectly dry place it under an exhaust pump, and you will find that the white lead coats will part from the wood or brick.

Now, I need not tell you how we usually paint a carriage body, but we do not first coat it with lead and then freely coat it with a matter which has no expansive quality, except when subject to intense cold, and which contracts by heat. We here find that the element which expands the under coats contracts the outer ones. Is it any wonder that our paint cracks and peels off, or that our putty protrudes and shows? Or can you tell me of a varnish that we can expect to be capable of resisting the laws of nature?

THAT delectable and piquant fruit variously known as the shaddock and the grape fruit was first made known to Western palates by a certain Captain Shaddock, who was in the East Indian trade. Why the Florida fruit growers should have named it the grape fruit is a mystery we have never seen explained.

SHIPS OF THE NEW UNITED STATES NAVY.

In August, 1882, Congress approved an act to complete the double turreted monitors and for the construction of a 6,000 ton protected cruiser. This act was so vague that it was not until March 2, 1883, that Congress appropriated $1,300,000 to begin the construction of four ships. With these ships the new navy was born, and each year since it has been added to until we have now a naval list of nearly a hundred ships in commission, ready to be commissioned or building.

Among this number are five double turreted and thirteen single turreted monitors, six battle ships, one coast defense ship, twenty-five cruisers, one dynamite cruiser, one harbor defense ram, one naval school ship, eight gunboats, six torpedo boats (including one ram and one submarine), one survey and one dispatch boat, besides many vessels of smaller build and efficiency, serving in different capacities where they are respectively stationed.

Of the enumerated vessels, the six battle ships, eighteen cruisers, six gunboats, five torpedo and one dispatch boat, the naval school ship Bancroft, the harbor defense ram Katahdin, the dynamite cruiser Vesuvius and the coast defense ship Monterey, are built of steel.

The eighteen armored monitors, one cruiser, two gunboats, the survey steamer Ranger and the ram Alarm are of iron, while the old wooden ships include six cruisers and the store ship Mohican.

The ships are divided into four classes: (1) Armored, including the battle ships, monitors, cruisers and coast defense ships; (2) unarmored protected vessels, including cruisers, gunboats and dispatch boats; (3) unarmored ships of iron; (4) wood, comprising vessels of the old navy.

The illustrations on other pages will give our readers a fair idea of the appearance and the proportionate sizes of forty of these new vessels, the earliest built vessels being shown on the page to the left, and those of later construction on the right hand page.

The first class battle ships Massachusetts and Oregon, on page 201, are each of 10,231 tons displacement, 9,000 indicated horse power, developing a speed of 16 knots to the former and 16·8 knots to the latter. In armament these two ships are precisely the same, carrying four 13 inch, eight 8 inch and four 6 inch breech-loading rifles, sixteen 6 pounder and four 1 pounder quick fire, and four Maxim guns. The second class battle ship Texas has a speed of 17 knots with 8,600 indicated horse power and a displacement of 6,300 tons. She mounts two 12 inch and six 6 inch breech-loading rifles, twelve 6 pounder, four 1 pounder quick firing and four Maxim guns.

Of the protected cruisers, the Chicago has a displacement of 4,500 tons, a speed of 15 knots and 5,000 indicated horse power. Her battery contains four 8 inch, eight 6 inch, and two 5 inch breech-loading rifles, four quick fire and eight Maxim guns. The Baltimore has a displacement of 4,413 tons and indicated speed of 19·2 knots furnished by engines of 10,750 indicated horse power. Her battery has two 8 inch and six 6 inch breech-loading rifles, four 6 pounders, two 1 pounder quick fire and seven Maxim guns. The Philadelphia, with the same displacement as the Baltimore of 4,413 tons, has made 19 knots with 10,500 indicated horse power. She mounts twelve 6 inch breech-loading rifles, four 6 pounder, four 1 pounder quick fire and 7 Maxim guns. The San Francisco has displacement of 4,083 tons, a speed of 19·5 knots and engines of 10 500 indicated horse power. She carries twelve 6 inch breech-loading rifles, four 6 pounder quick fire and seven Maxim guns.

The Atlanta and Boston have each a displacement of 3,189 tons. The Atlanta has a speed of 15·4 knots, attained by 3,511 indicated horse power; the Boston requiring 3,780 indicated horse power to attain a speed of 15 knots. On both of these ships the batteries are the same, consisting of two 8 inch, six 6 inch breech-loading rifles, six quick fire, and six Maxim guns.

Of the unprotected cruisers, the Minneapolis has developed a speed of 23·073 knots, with engines of 21,000 indicated horse power. Her displacement is 7,475 tons, she carries one 8 inch and two 6 inch breech-loading rifles, eight 4 inch rapid fire, twelve 6 pounders, eight 1 pounder quick fire, and four Maxim guns.

The Cincinnati and Raleigh are government productions, having been built, the former at the Brooklyn navy yard, and the latter at the Norfolk yard. They are of 3,183 tons displacement, 10,000 indicated horse power, and a speed of 19 knots each. The Cincinnati carries one 6 inch and ten 4 inch breech-loading rifles, two 6 pounders, two 3 pounder quick fire, and four Maxim guns. Mounted on the Raleigh are one 6 inch breech-loading rifle, ten 5 inch rapid fire, eight 6 pounder, four 1 pounder quick fire, and two Maxim guns.

The gunboat Yorktown, one of the first four ships authorized, has a displacement of 1,700 tons, an indicated horse power of 3,400, develops a speed of 16 knots, mounts a battery of six 6 inch breech-loading rifles, four 6 pounder quick fire and five Maxim guns.

After building and commissioning the next two gunboats Machias and Castine, they were found to be too topheavy in a seaway. To rectify this defect it was decided to lengthen them. Accordingly the two vessels were cut in two amidships and rebuilt, thus righting the blunder originally made. In these two vessels there is but one point of difference, the Machias having a speed of 14·5 knots from 1,600 indicated horse power engines with a displacement of 1,050 tons, where the Castine makes but 14 knots with the same horse power and displacement. In armament the two vessels each carry eight 4 inch rapid fire, four 6 pounder, two 1 pounder quick fire and two Maxim guns. The Petrel is of 890 tons displacement, has a speed of 13 knots, engines of 1,300 indicated horse power, a battery of four 6 inch breech-loading rifles, three 3 pounder quick fire and four Maxim guns.

The coast defense double turreted ship Monterey has a displacement of 4,048 tons, a speed of 16 knots, engines of 5,400 indicated horse power.

Mounted in her two turrets are two 12 inch and two 10 inch breech-loading rifles, with a lighter battery of six 6 pounder, four 1 pounder quick fire and four Maxim guns, mounted on the superstructure and in the fighting top.

The harbor defense ram Katahdin carries but a light secondary battery of four 6 pounder quick fire guns. She has a displacement of 2,050 tons, a speed of 17 knots, and engines of 4,800 indicated horse power. The dynamite cruiser Vesuvius has a displacement of 725 tons, a speed of 21 knots, and engines of 3,200 indicated horse power. She was designed to throw 600 pound charges of dynamite from her 15 inch pneumatic guns, which are supplemented by three 3 pounder rapid fire guns. The torpedo boat Cushing is of 116 tons displacement, has engines of 2,500 indicated horse power, and a speed of 22·5 knots per hour.

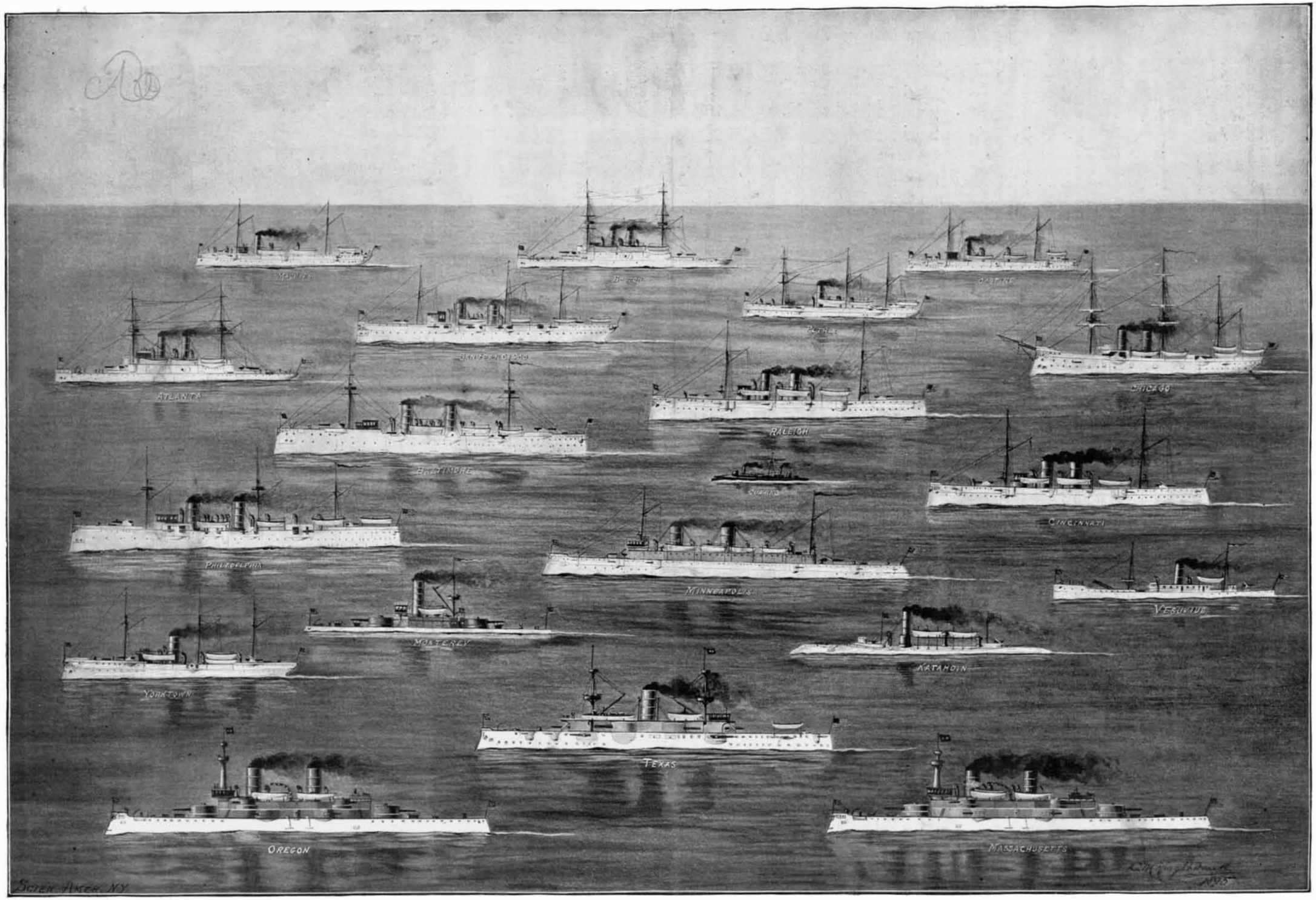
Among the vessels shown on page 201, the Iowa stands first with a displacement of 10,286 tons, indicated horse power of 11,000 and a contract speed of 16·5 knots. When ready for active service the Iowa will carry a battery of four 12 inch and eight 8 inch breech-loading rifles, six 4 inch rapid fire guns, twenty 6 pounder, six 1 pounder quick fire and two Maxim guns. The Indiana, now nearing completion, is one of the three heaviest vessels which at present are on the naval list. She has engines of 9,000 indicated horse power, a speed of 16 knots and a displacement of 10,231 tons. In armament and construction she is the counterpart in every particular of her sister ship Massachusetts. Her battery will have four 13 inch, eight 8 inch, and four 6 inch breech-loading rifles, sixteen 6 pounder, six 1 pounder quick fire and four Maxim guns. The second class battle ship Maine has a displacement of 6,648 tons, a speed of over 17·7 knots, and engines of more than 9,000 indicated horse power. She has four 10 inch and six 6 inch breech-loading rifles, with a secondary battery of twelve 6 pounder, four 1 pounder quick fire and four Maxim guns. The cruiser Brooklyn, now on the stocks, is an improved model of the New York. She is to have a speed, according to contract, of 21 knots, to be of 16,900 indicated horse power and have a displacement of 9,250 tons. Her batteries will be eight 8 inch breech-loading rifles, twelve 5 inch rapid fire, twelve 6 pounder and four 1 pounder quick fire, four Maxim guns and two light or field pieces.

The New York has a speed of 21 knots, triple expansion engines of 16,000 collective indicated horse power, and a displacement of 8,150 tons. Her armament consists of six 8 inch breech-loading rifles, twelve 4 inch rapid fire, eight 6 pounder, four 1 pounder quick fire, and four Maxim guns. The Newark has a displacement of 4,083 tons, an indicated horse power of 8,500, driving her at the called for speed of 19 knots. In armament she is inferior to the Chicago, carrying twelve 6 inch breech-loading rifles, four 6 pounders, quick fire, and nine Maxim guns. The Charleston has a displacement of 3,730 tons, engines of 7,500 indicated horse power at a contract speed of 17 knots. Mounting batteries of two 8 inch and eight 6 inch breech-loading rifles, four 6 pounder, two 3 pounder quick fire, and eight Maxim guns.

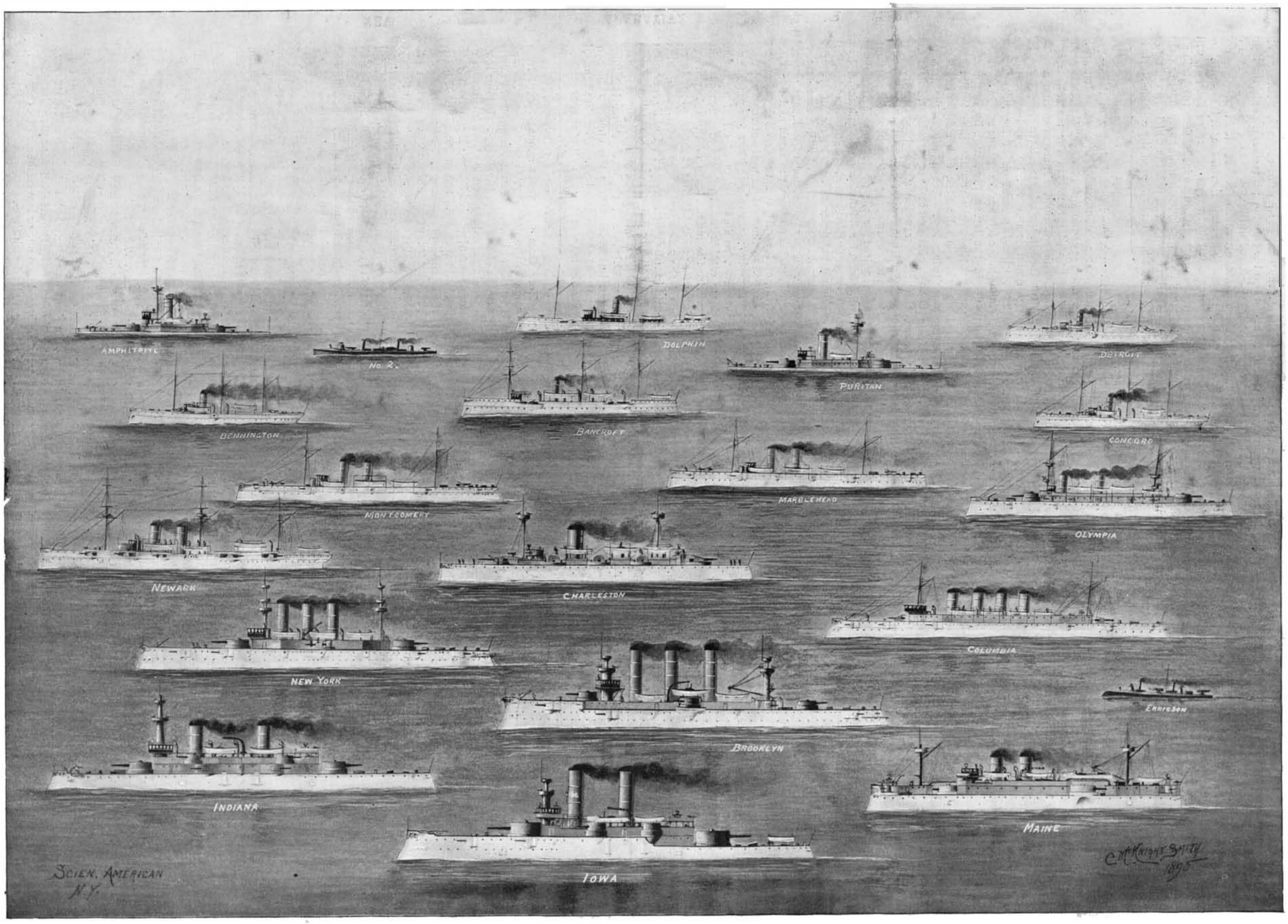
In the Marblehead and Montgomery the government contract calls for two ships of the same dimensions and armament, with displacements of 2,000 tons, engines of 5,400 indicated horse power, driving the ships at a speed of 18·3 knots. The batteries of these two ships comprise two 6 inch breech-loading rifles, four 4 inch rapid fire, four 6 pounder, three 3 pounder quick fire, and two Maxim guns.

The Concord and Bennington are similar ships in all but their displacement, the latter being 1,750 to the former's 1,700 tons displacement, with indicated horse powers of 3,400 and called for speed of 17 knots. In armament these two ships are identical, mounting six 6 inch breech-loading rifles, four 6 pounder quick fire, and five Maxim guns.

The Columbia has a displacement of 7,475 tons, engines of 21,000 indicated horse power and a speed of over 22 knots. She is probably the fastest cruiser in the world. In armament the Columbia and Minneapolis are identical, carrying one 8 inch, two 6 inch breech-loading rifles, eight 4 inch rapid fire, twelve 6



THE NEW UNITED STATES NAVY—COMPARATIVE DIMENSIONS OF THE VESSELS.



THE NEW UNITED STATES NAVY—COMPARATIVE DIMENSIONS OF THE VESSELS

pounder, eight 1 pounder quick fire and two Maxim guns. The Olympia, with a displacement of 5,500 tons and engines of 13,500 indicated horse power, has a speed of 20·2 knots. In her batteries she carries four 8 inch breech-loading rifles, sixteen 5 inch rapid fire, fourteen 6 pounder, six 3 pounder quick fire and four Maxim guns. Among the first of the new ships, the Detroit was built on a contract calling for a displacement of 2,000 tons, driven by engines of 5,400 indicated horse power at a speed of 18 knots. She mounts two 6 inch breech-loading rifles, four 3½ inch rapid fire, four 6 pounders, two 1 pounder quick fire and two Maxim guns.

Among the vessels commissioned in 1894 was the naval training ship Bancroft of 838 tons displacement, with engines of 1,300 indicated horse power, developing a speed of 13·5 knots. For practice and drill her batteries comprise four 4 inch rapid fire, two 6 pounder, two 3 pounder, one 1 pounder quick fire and two Maxim guns.

The Dolphin, which was one of the first four ships contracted for of the new navy, is of 1,485 tons displacement, with engines of 2,300 indicated horse power and a speed of 15·5 knots. She is now the dispatch boat of the U. S. navy, carrying but a light armament comprising two 4 inch rapid fire, two 6 pounder quick fire and six Maxim guns.

Of the monitors, the Puritan, with two turrets mounting four 10½ inch breech-loading rifles, four quick fire and eight Maxim guns, with a displacement of 6,060 tons and indicated horse power of 3,700, attaining a low speed of 13 knots, is the largest and heaviest of her type.

The Amphitrite, another of the monitor class, carries four 10½ inch breech-loading rifles in two turrets, with a secondary battery comprising six quick fire and four Maxim guns; she has a displacement of 3,990 tons, and engines of 1,600 indicated horse power, developing a 12 knot speed, and is one of three ships of this class that stand next to the Puritan.

The torpedo boats Ericsson and the one now known as No. 2 are greatly different in size, the former having 750 tons displacement against No. 2's 120. These little fliers have a speed of 23 knots in the Ericsson and 24 in No. 2.

An Expedition to the Antarctic Regions.

Dr. Frederick A. Cook, the well known explorer, has recently declared his intention of leading a small but well equipped body of scientific men on an exploring expedition to the Antarctic regions. The time for leaving New York has been fixed for September 1, 1895, and it is expected that the voyage will last for probably three years. There can be little doubt but that there will be much of scientific interest learned by such an expedition. The floor of the Antarctic Ocean is covered with an abundant fauna which will well repay a careful study. And it is thought probable that some isolated tribe of men may be discovered on the Antarctic shores. There is also much to be learned of the magnetic properties of this little known region, of its ethnology, and much of more technical scientific interest.

The details of the manner in which the expedition is to be equipped are interesting.

The party intend to sail in two small sailing vessels, each of about one hundred feet in length and of from 100 to 200 tons burden. Each vessel will be of the type known as "sealers" and will be manned by five men. The hulls of the boats will be thickly sheathed in timber and heavily braced in order to resist the pressure of ice jams. Provisions will be supplied to last for three years. The garments to be worn will be of the Esquimau pattern and there will be a plentiful supply of fur sleeping bags, robes, etc.

A fine pack of Esquimau sledge dogs will also be provided. The scientific corps will consist of five men, who will carry with them such equipments as will assist them in carrying out their various lines of investigation. It is expected that it will take about three months to reach the Gulf of Erebus and Terror, where the expedition will probably disembark. A substantial wooden house will then be erected to be used as the headquarters.

Later on the sledging parties will be sent out from this point to penetrate as far south as possible. The party will, as far as possible, be made up of men experienced in Arctic exploration. Dr. Cook, it will be remembered, was surgeon and ethnologist in Lieutenant Peary's first expedition to the North, and he has been to the Arctic regions twice since.

Oil Production in Pennsylvania.

The oil fields of Pennsylvania have produced during the year 1894 about 30,000,000 barrels of oil. During the year 1893, the total product was 31,000,000 barrels. The oil was sold during 1893 for 64 cents, and last year for 84 cents a barrel. In all about 3,900 new wells were drilled in 1894, while in the previous year only 2,000 new wells were prepared. The demand for Pennsylvania oil showed no diminution during the year.

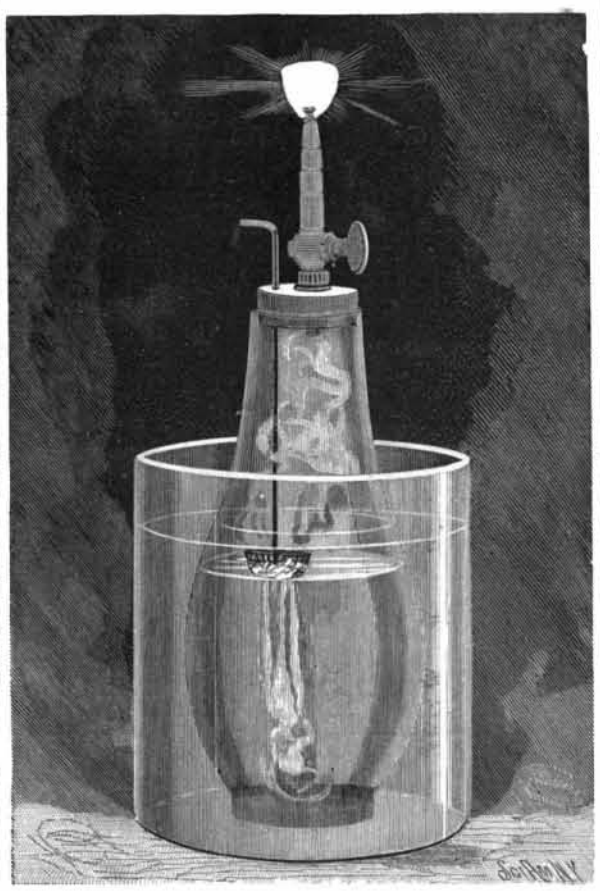
ACETYLENE APPARATUS.

T. O'CONOR SLOANE, PH.D.

Few chemical discoveries have attracted more interest than the recent one of the method of manufacturing acetylene on a large scale. The production of the calcium carbide from which the acetylene gas is made by simple treatment with water bids fair to become a commercial process, and we have every reason to hope that the material will soon be produced by the ton. There is something fascinating in the idea of being able to evolve a gas of about 300 candle power by so simple a process. While the crudest possible apparatus, such as a tumbler of water, is sufficient to illustrate the production of the gas, the object of the present article is to show how a better demonstration can be produced with very simple appliances.

To show the gas with a tumbler of water, it is sufficient to drop into it a piece of the calcium carbide as large as a pea; the gas is at once evolved in large quantity, and a match can be applied repeatedly to the accumulation of bubbles on the surface of the water, giving a number of successive lightings. The apparatus illustrated in the cut, which gives more satisfactory results, is constructed from a battery jar and lamp chimney as the principal elements, and is made on the lines of the old hydrogen evolution apparatus.

To the top of the lamp chimney, which should be of large size, a cork should be tightly fitted. Unless the cork is better than the majority, it should be waxed or paraffined, which is very easily done by placing some fragments of wax or paraffine on it and melting the material with a hot soldering iron or poker. Through a central perforation a tube is inserted fitted



ACETYLENE APPARATUS.

with a stop cock and a gas burner; the latter must be of the smallest size made, the Bray fishtail burner answering about the best of any yet tried. Merely to exhibit the gas, a simple jet may be made by drawing a glass tube almost to a point or by drilling a very small hole in a cap fitted to the pipe leading from the stop cock. Through a hole a little to one side of the evolution pipe a wire passes which moves up and down with some friction through the hole. Its lower end is formed into a hook, to which is suspended a little basket made by bending up a little bit of coarse wire gauze. A piece with one-quarter inch meshes will be about right. The suspending wire is bent at the top to give it a better handle.

To operate it, the lamp chimney is placed in the jar, the water is poured in until within an inch or two of the top, and a piece of calcium carbide half the size of a walnut is placed in the basket, which is drawn up until pretty close to the cork. The cork is now placed in the lamp chimney and pressed down so as to make it fit tightly, and the wire slowly worked down until the basket becomes partially immersed in the water. The level of the water is at once depressed as the gas is evolved, and if the cock is open the air and gas within the chimney begin to escape. As soon as the odor of the escaping gas is strong, it can be lighted and will burn for five or ten minutes with great steadiness. If the pressure decreases and the water rises. it comes in contact with the calcium carbide, more gas is evolved, and it falls again.

The apparatus may be further simplified by omitting the stop cock, which is unnecessary, and a bucket may be substituted for a battery jar. It may also be necessary to secure the chimney against floating upward, although in the apparatus shown this is quite unnecessary.

It is well before lighting the gas to hold a test tube over the outlet for a few seconds until filled with the gas, and to light it with a match or at a gas burner. If the contents do not explode, it is safe to light the jet on the chimney; if it does explode, the light should be deferred until purer gas is evolved. Two or three minutes are sufficient to get it in working order. It must also be remembered that it is essential to have a very small burner, as otherwise the gas will smoke and the supply will be insufficient to obtain a satisfactory flame. The suspending wire must fit tightly, as if it slips down the apparatus will blow out or overflow. A very slight immersion of the carbide starts it.

Oil of Lemon.

Although the lemon industry in the United States has not reached any very large proportions, yet Florida lemons, says the International Confectioner, are occasionally to be found in the market, and Southern California will no doubt soon contribute. The oil is contained in the minute cells in the yellow rind of the fruit, and is removed by hand pressure, hence the term "hand pressed oil of lemon." The operator holds in the left hand a sponge and in the right a section of the lemon peel, and, by dexterous pressure against the sponge, ruptures the oil cells; the sponge absorbs the oil, and a dish held in the lap prevents any being lost. When the sponge has taken up enough of the oil to be squeezed out, this is done, and the process repeated over and over again.

The tediousness of the method will be apparent when it is estimated that about one thousand lemons are required for the production of a single pound of oil. Oil of an inferior quality is made by machine pressure, by distillation, etc., but the principal bulk is produced as described. The manufacture of the oil is carried on very largely by the peasants throughout Sicily. Every proprietor of a lemon grove, large or small, makes oil from the small and irregular shaped fruit, and sends the better class to market to be shipped to the various parts of the world.

Experiments within the last few years have proved, however, as in the case of oil of peppermint, that large establishments, where great care is taken to supervise the manufacture of the oil, turn out a much superior product to that of the small producer.

Of the adulteration of oil of lemon nothing will be said in this article, except that while enormous quantities of oil containing more or less adulteration are being sold, yet an absolutely pure oil can be had at a reasonable price, if the confectioner is willing to pay that, but if he wants the cheapest he can get, he must not expect the best. What has been said about oil of lemon will apply to oil of sweet orange.

Asbestos Garments.

More than fifty years ago a student from Greece came to the academy, Monson, Mass., bringing with him from his native country a species of overcoat with attached hood made of asbestos. It long remained in the mineral cabinet of the above institution as an example of fireproof clothing made from this flexible mineral substance. Improvements have been made in the methods of spinning and weaving asbestos fiber, so that now it is practicable to weave a cloth of asbestos almost as fine as cotton cloth. This, of course, is not very strong, but by spinning thicker threads and doubling them a cloth can be made that is strong enough for most purposes and is still flexible. It is now recommended that this material be used as a protective dress for firemen, and at a meeting of the National Association of Fire Engineers at Montreal last summer a representative of the company that is exploiting this idea demonstrated how it could be carried out. Clad in a suit of asbestos cloth he entered a burning frame building especially prepared for this test and remained there for several minutes, during which time he gave an exhibition of the utility of the fireproof asbestos rope for life saving, etc.

The asbestos suit which was worn consisted of a pair of boots, protected by iron soles, gaiters, pantaloons, jacket, apron, gloves and helmet, the last being provided with eye pieces of mica. Inside of the jacket is carried a respirator which cools and purifies the hot, smoky air and allows the air breathed to be expelled properly. The efficiency of such a suit depends not only upon the non-combustibility of the material, but also upon the fact that it is a non-conductor of heat, becoming hot so slowly that the wearer has ample warning of the proper time to flee. It is in no way hurt by water. It is not proposed that every member of a fire department shall wear such clothing, but it is urged that one or two members of every company be provided with them.

Other uses for these fabrics, such as the cloths made by H. W. Johns Mfg. Co., of this city, are for protecting merchandise against cinders; to extinguish small fires by smothering; for drawing between buildings; and as a protection covering for the fire hose. It is already used extensively for drop curtains and flies in theaters.