Miscellaneous Notes.

Forest Park, St. Louis, is one of the finest parks in the world. It contains two square miles, or 1,280 acres, of forest, glade, lake, and river, with twenty miles of roads and walks.

The Bell telephone patent monopoly in England has expired. The patent there was granted for 14 years. Cheap telephones will now prevail in England the same as in Germany, where Bell failed to obtain a patent. In this country, the Bell patent will expire March 7, 1893, having been originally granted March 7, 1876, for a term of 17 years.

The new U. S. protected cruiser Newark on her recent trial, December 22, 1890, developed a speed of 19·6 knots, under forced draught, during four hours' run. This is one of our latest and best cruisers. She is 327 ft. 7 in. extreme length, 49 ft. beam, displacement 4,090 tons, 8,500 to 9,000 h. p. The new English built Argentine protected cruiser 25 de Mayo on her recent trial trip attained a speed of 20·75 knots with natural draught, and 22·43 knots with forced draught. This ship is 325 ft. extreme length, 43 ft. beam, 3,200 tons displacement, 8,500 h. p. natural draught and 13,800 h. p. forced draught. It will be seen from the foregoing that the English built ship is far superior to the Newark in power and steaming qualities. Somehow or other the latest U. S. vessels are always prone to be behind the latest European vessels in those essential qualities, power and speed. Can anybody explain the real reason?

What is the best position for the bridge aboard a war ship? Our naval architects are of opinion that it should be well forward, in some cases, as on the Yorktown and Concord, setting it up over the topgallant forecastle, and on the Baltimore and Philadelphia jamming it still further up into the bows. The British, on the other hand, think the waist or 'midship section the best place for it; holding that a commanding officer should be able to con his ship without facing about. This is a recommendation, surely, but the advantages of having a clear horizon, an unobstructed view ahead, will appeal to the nautical mind. A bridge forward of the mizzen or even between fore and main masts never affords an unbroken view; in maneuvering, or, worst of all, in meeting other craft or working in a narrow channelway, interposing objects, such as masts, yards and stays, seriously incommode and at times obscure the view. In practicing a crew at working ship or guns, a bridge well aft, as in the British method, affords a better opportunity for critical study, and perhaps, as the British designers allege, in the thick of battle gives the commander a better control of his batteries, but for general service, whether in combat, maneuvering or cruising, the forward position would seem to promise the best results.

The Projected Balloon Voyage to the North Pole.

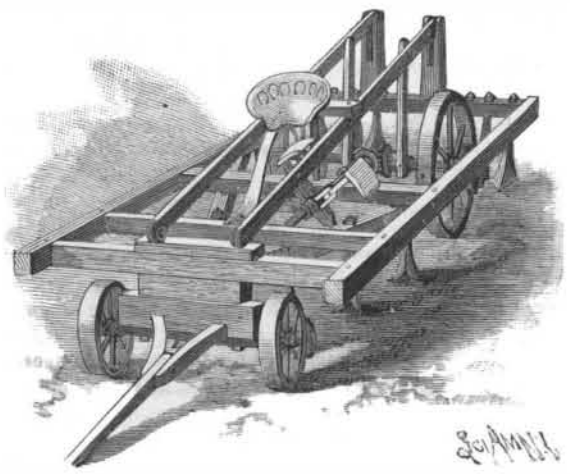
The two daring aeronauts who propose to make a journey to the North Pole, as described and illustrated in the SCIENTIFIC AMERICAN of December 20, 1890, are meeting with many discouragements. The French Society of Aerial Navigation has pronounced unanimously against it. At a recent meeting of the society in Paris, the president, Mr. Mage, editor of *Cosmos*, made an address which was quite disheartening to the projectors of the enterprise. He advised them to make better use of their energy and devotion to science than to attempt to reach the North Pole by balloon. Mr. Mage said it was impossible to believe the gentlemen would succeed. All our information about the prevailing winds in the polar regions indicates that each extremity of the earth's axis is a region of circular wind currents. There is little prospect that the wind would carry balloon travelers to their destination. Then, even in summer, a very low temperature prevails, heavy falls of snow are frequent, and it is difficult to believe a balloon could remain in midair while heavily weighted with snow. Frost upon the ropes and other parts of the rigging would make the management of the balloon extremely difficult, if not impossible. The land or water surface would for days at a time be obscured by heavy mists. The compass would be useless, and the voyagers would have to try to direct their movements by the stars, an art in which balloon travelers are not proficient. Mr. Mage's remarks were endorsed by the entire society.

Mr. Hermite, who, with Mr. Besancon, projected this daring voyage, said in reply that he and his comrade intended next summer to go to Spitzbergen and launch pilot balloons for the purpose of learning all they could at that point of the direction of the prevailing winds. If the result of these experiments is favorable, they will return to France and prepare to make their polar voyage in 1892. If the results are unfavorable, they will renounce the expedition. He did not believe that the difficulties in the way of balloon traveling were so great as the president believed.

Another speaker said that during the summer, at a mean altitude not exceeding 3,500 feet, and the mean temperature during his journey was not less than 40° below the freezing point, and yet his voyage was across the southern part of the island. It was the sheerest folly to suppose a balloon, which has as much rigging as a ship, could successfully be carried across the North Pole.

A COTTON CHOPPER AND CULTIVATOR.

The illustration represents a machine provided with hoes for chopping cotton or other plants, cultivators for working the plants, scrapers to clear the earth in advance of the hoes, and harrow teeth for use when desired. It has been patented by Mr. Thomas E. Anderson, of Jackson, Tenn. Upon the bottom of the main frame are two diagonal side beams, near the forward end of each of which a scraper is adjustably secured. Farther back on each beam are harrow teeth, bifurcated at their lower ends, with the members flaring in opposite directions, these teeth being preferably so attached to the beams as to be vertically adjustable. In the rear end bar of the main frame, at each side of the center, a series of cultivator blades is secured, these blades preferably being of what is known as the "elk's foot" pattern. The rear axle is journaled in vertically adjustable boxes sliding in hangers attached to the main frame, and a bevel gear on this axle meshes with a similar gear on a longitudinal shaft, the bearings of which are capable of vertical movement, and upon this shaft is the chopper. The hub of the chopper has radial arms with longitudinal grooves in which the shanks of the hoe blades are adjustably arranged, one hoe to each radial arm. Located longitudinally over the main frame is a lifting frame having near its rear end downwardly extending hangers which receive the rear axle, and by manipulating an adjusting screw the rear end of the frame is elevated, with the axle and longitudinal shaft, thus regulating the depth of cut of



ANDERSON'S COMBINATION COTTON AND CORN HOE AND CULTIVATOR.

the scrapers and rear cultivators. The depth to which the hoes shall cut is regulated by the adjustment of the hoes upon the arms of their carrying hub. As the machine is drawn forward, the scrapers clear the earth in advance of the hoes, which revolve rapidly to remove the surplus plants, while the cultivators at the rear pass between the remaining plants and throw up earth over their roots. When the hoes are in operation the harrow teeth are preferably adjusted so as not to touch the plants or the ground, these teeth being more especially adapted for use in connection with the rear cultivator teeth only, the longitudinal hoe shaft being then thrown out of gear with the rear driving axle.

New Experiments in Magnetism.

BY A. E. DOLBEAR.

It has long been known that a common sewing needle will float if carefully placed upon a surface of water; also, that if the needle be magnetized it will assume a position in the magnetic meridian. Iron and steel filings will also float, and they can be sprinkled upon the liquid surface nearly as well as upon a solid. If the pole of a magnet be brought near to the floating particles, they will respond to the solicitations of the magnetic field in a very free and easy manner.

Let a strong U-magnet have its poles brought near to the iron filings, and they will at once arrange themselves in the well known forms, the lines being plainly seen. The induction, of course, causes adjacent particles to assume opposite polarities and consequently touch each other when free to move. If, now, the field magnet be removed, the filings will retain their arrangement, and if it be in a vessel large enough to permit the rotation of the whole body, it will swing into the magnetic meridian if it did not happen to be in it at first, thus showing that the *arrangement* constitutes the magnet, and that as a whole it possesses a magnetic field upon which the earth's field can act.

Now bring gently near the floating magnet one pole of a bar magnet. If this be presented to one of the poles of the particles it will be attracted toward it, and the whole body will rotate more or less; but this must be done slowly, else the arrangement of filings will be broken up. The opposite pole will, of course, under similar conditions, exhibit repulsive action, and the whole will swing about.

If, now, the magnetic pole be brought near to the middle of the arranged filings, some of the groups will be more or less disintegrated from the rest, and will rotate upon a vertical axis and quite turn round. The opposite pole presented will cause them to rotate back again. Great numbers of these can be seen to turn thus whenever a pole is thus presented.

This phenomenon is evidently precisely the same in character as that illustrated at length by Ewing in his late investigations into the constitution of magnets, wherein he used small magnetic needles mounted upon pivots. The above experiments can be tried in a saucer of water, but the whole is capable of being projected with the vertical attached to a lantern, and the movements of all sorts seen upon a screen with ease and very little painstaking.—*Electrical Engineer.*

The Sturtevant Rotating Battery for Harbor Defense.

For the defense of harbors where the ground admits of the formation of an artificial island, Thos. L. Sturtevant, of South Framingham, Mass., proposes the following plan:

An island of generally circular form is established which incloses a circular reservoir of water. Protection is afforded the reservoir by inclined armor plates buried under the earth and surrounding it by a protective subterranean cave. Within the reservoir a circular floating battery is established, pivoted or anchored by a central pin driven into the bottom of the reservoir. The battery has a roof like an inverted saucer, and is perforated for heavy guns. The armor plate may be of the heaviest kind, as the displacement may be increased to any desired extent. The roof is extended beyond the sides of the tunnel, so as to cover nearly the entire area of the reservoir. A sluiceway is carried out under the surface of the island to admit water if desired. A valve or gate is provided to prevent its escape. In use the entire battery is rotated by hand or by power, so as to bring its guns to bear on any desired point.

Trial Trip of the Gunboat Concord.

This new steel vessel made a successful trial trip on Long Island Sound, January 13. She is a sister ship to the Yorktown, described in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 687. The trial lasted four hours, during which the engines were required by the contract to develop an average of 3,400 horse power, with a bonus of $100 for each horse power above this number and a corresponding penalty below. The machinery easily fulfilled the requirements, in the opinion of the engineers, and the vessel is thought to have earned a premium of some $16,000.

The engines worked beautifully with no water on the bearings and the throttle wide open all the time. The steam pressure averaged 160 pounds for the four hours. The average number of revolutions of the engines was slightly over 150. The boilers worked well also, keeping a steady pressure of steam all the time, with about two inches of air pressure in the blower ducts. The average speed made was 15·8 knots per hour by log, but allowing for current running against the vessel, the actual speed was computed to be 16·8 knots.

The Concord has the closed ash-pit system of forced draught. She is a twin-screw, coal-protected steel gunboat, with poop and forecastle decks and an open gun deck between; length, 226 feet; mean draught, 14 feet; displacement, 1,700 tons. There are two horizontal triple expansion engines in separate water-tight compartments, one forward of the other. The cylinders have a thirty-inch stroke. The engines are fitted with the Marshall valve gear and piston valves. There are four steel boilers, diameter 9 feet 9 inches, and length 17 feet 9 inches. Each has three corrugated steel furnaces. Grate surface total, 220 square feet. Total weight of machinery, with boilers filled, 331 tons. The propellers are of manganese bronze, three-bladed, and of the modified Griffith type. Diameter, 10½ feet; mean pitch, 12½ feet.

The contract for this ship was made November 15, 1887, with the Quintard Iron Works, and she was to have been completed in eighteen months, but the contractors were subject to delay on account of difficulty in getting material.

When put in commission she will have a battery of six 6-inch breech-loading rifles and eight rapid-fire guns and revolving cannon. She has, besides, eight torpedo-launching tubes. She is rigged as a three-masted schooner, spreading 6,300 square feet of sail, and will have a crew of 150 men.

M. LUDOVIC JAMMES, in the *Revue d'Hygiene*, reports that commercial travelers are offering imitation coffee berries which can be sold so low to dealers as to yield a profit of 100 per cent. These berries are made artificially from vegetable glands and the flour of some cereal. This mixture is placed in a mould and dried. The slit in the false berry is neither so long or deep as in the real berry. The color is well imitated, but the false berry is much harder and cannot be broken with the teeth. These berries are mixed with a small proportion of the true berries before selling.