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NEW YORK, MAY 11, 1878.

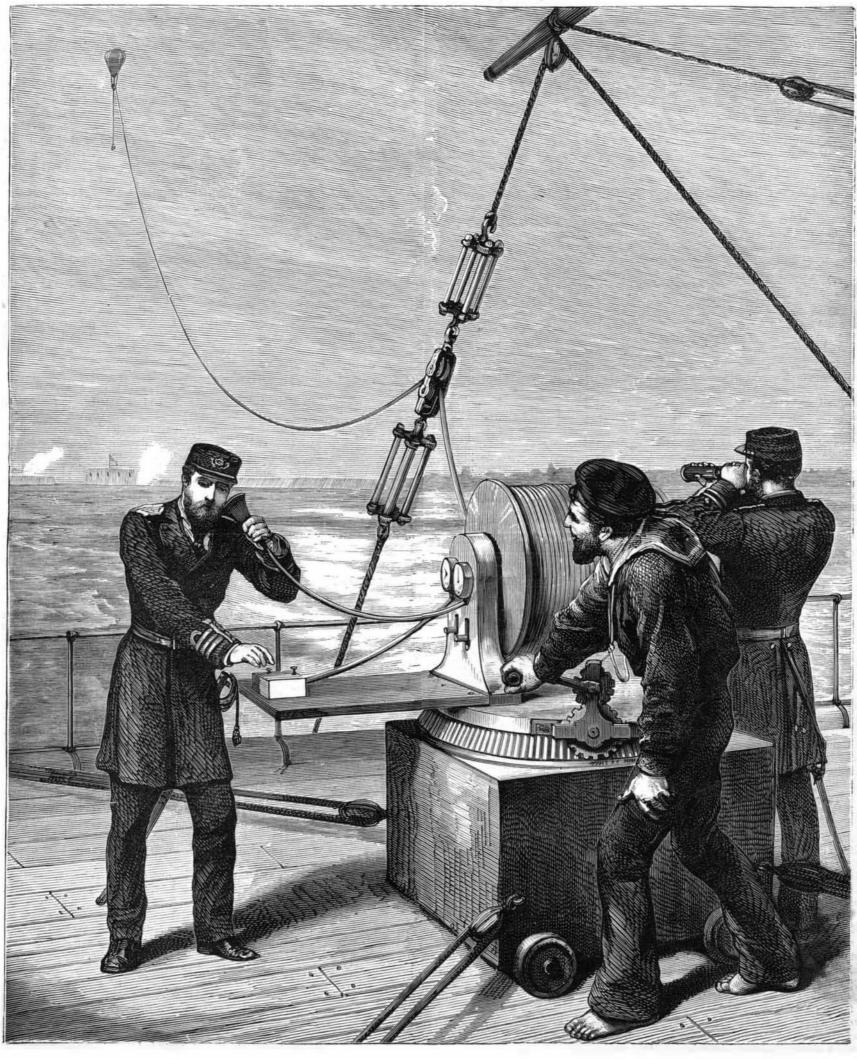
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AERIAL WARFARE.

The idea first published in these columns of dropping torpedoes into an enemy's camp or cities from balloons seems large enough to carry one man and the can of nitro-glycerin is indicated by dials on the side of the winch drum, and by in a fair way to be put in practical shape abroad. The London Graphic publishes the large engraving given herewith, showing how a balloon carrying a large torpedo could be wire, which is rove through a fair-leader and taken to the him directions when to slacken or reel in the wire. The

sent over a hostile fort from on shipboard. Our cotemporary proposes that gunboats shall be provided with balloons or other powerful explosive suspended at considerable dis-

winch shown on the poop of vessel. The length of wire paid out as the balloon moves over the point to be attacked means of a telephone the officer directing operations com-



THE BALLOON TORPEDO.

vessel lies out of range of the fort's guns, and the balloon is allowed to ascend to a thousand feet or so before dropping its torpedo.

We are inclined to think that a good many practical difficulties would oppose themselves to the Graphic scheme, mostly arising from the necessity of keeping the balloon captive. The strain on a wire nearly six miles long would be great, and the weight of the wire would be a heavy load for a balloon to carry. The wire, besides the strain of its own weight, would be subjected to the pull of the balloon, which would vary in intensity according to the force of the wind. It probably would be necessary to employ steel wire at least as large as that used in the East River Bridge construction, which is capable of withstanding some 4,000 pounds tensile strain. Six miles of wire would be scant allowance to enable a vessel to keep out of range of improved modern rifled guns, and this quantity of the wire mentioned would weigh strain added, when the balloon is hauled in against its own ascensive power and against the wind, might increase the stress above the breaking point, and therefore still thicker wire or wire rope weighing still heavier might be needed. Assuming, however, that the bridge wire could be used. to the above weight of 2,900 pounds must be added, say, 500 pounds for the torpedo, and at least 700 more for weight of balloon car and occupant, making in all 4,100 pounds. Now it requires nearly 60,000 cubic feet of hydrogen to lift this weight with an ascensive force of 100 pounds, and the diameter of such a balloon would be in the neighborhood of 48 feet. It would be scarcely possible to manage and inflate a balloon of this size on board ship, while the wind pressure on it might easily cause its pull to exceed the tensile strength still larger balloons, and, on the other hand, thinner wire still would be subjected to the same wind stress. We therefore doubt the practicability of any plan which involves a captive balloon and at the same time the keeping out of range of guns.

There are other ways, however, which might be resorted to to accomplish the same purpose. For example, the balloon might be sent up with no one in its car, thus saving that much weight. Connected with it might be simply a light double wire, capable of carrying an electric current to a magnet which would pull back a detent and so drop the torpedo. A favorable wind would have to be waited for to waft the balloon over the desired point, and its position at any time could easily be determined by measurement with the sextant. Or the balloon might be left entirely free, with simply a clockwork contrivance to drop the charge after a certain period. The movement of the works would be regulated according to the strength of the wind as indicated by the anemometer, and the estimated period of time which would elapse before the balloon would be carried over the required place. This, however, would be very inaccur-

Defense against "dejectiles," as the Graphic proposes to call torpedoes dropped from the clouds, would consist in other balloons sent up to wage warfare aloft, or the invention of some kind of gun would be needed that would throw shells long distances at high elevations with accuracy. The projectile to use against torpedo balloons would be a shrapnel filled with explosive bullets, which, when the bomb burst, would be projected over a wide sphere. One bullet of this kind striking a gas bag would blow it up, and make it drop its charge where not intended by the enemy. Rockets would probably be revived again as defensive means against balloons, and doubtless would prove very useful. Of course, however, the main object would be to explode the torpedo in the air and some time before it could reach the ground and do damage, and over this problem we leave inventors to exercise their ingenuity.

As we have already taken occasion to point out, we think that if aerial torpedoes do become a seriously offensive means of warfare, it will be by the aid of the flying machine. Mechanical flight is not impossible, and all the means are at hand, requiring only ingenuity to adapt them to one another 11. to insure success. The principles of flight are well understood, and it is possible to build light motors using electricity or even steam, which will keep an aerial ship aloft. This is the more important question bearing on future warfare. An

of Science and Arts, some entertaining and easily performed experiments in magnetism. Several sewing needles, of No. 5 or 6 size, are magnetized with the same polarity, so that all their points are N. Each needle is passed into a small cork that will just float it upright; the corks may be 1/4 inch long and a inch across. The eye of the needle should barely be above the surface of the cork. Three, four or more of these needles are thus to be floated in a basin of; v water and the N. pole of a large cylindrical magnet is to be brought down over them. They will immediately take geometrical positions, the figure formed being smallest when the magnet above is brought most closely to them. Three needles thus take position at the points of an equilateral triangle; four form a square, or a triangle with one in the center; five form a pentagon, or a square with one in the center; six form a pentagon with one in the center, or a triangle of two to a side. Professor Mayer has obtained regular figures up to a combination of twenty needles.

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ARGUMENTS FOR SECTION 11.

The proposed assimilation of our patent law to that of Great Britain, in the matter of periodical fees, was discussed before the House Committee on Patent Amendments by Messrs. Raymond, Christy, Storrow, Foote, and Smith. All but Judge Foote were decidedly in favor of the scheme; and we may fairly assume that they offered the strongest arguments they could command to sustain their position.

Mr. Raymond stood alone in his sweeping denunciation of the present working of the patent laws. He was not opposed to a wise patent system; for "a wise patent system does encourage inventions, and therefore promote public progress in science and the useful arts." But the working of our system during the past seventeen years has been the reverse of wise. Indeed, the law as it stands is, he said, so defective, and open to so many abuses, that he unhesitatingly and confidently asserted that "that part of the progress of recent years, during which the genius of the people has been exclusively directed to the arts of peace, which is directly the result of the patent system which has obtained during the same period, when put into the scales with the tax, the annoyance, the burden, the 'scare-crowing' of capital, the unnatural strifes, the unhealthy speculations, the inflated values, the exorbitant prices, the blackmailing, the tedious and expensive chancery litigation, and the other unholy practices which the patent law has of late hatched and fostered, the progress which it has brought about receives a shock which throws it up into thin air."

Mr. Raymond approves of Section 11 as a remedy for a considerable portion of the evils above enumerated—" evils resulting from trivial, impracticable, and invalid patents, and from those which become of value late in their existence, and then only for the purpose of infringement suits and speculations." The provision of this section, he goes on to say, has been criticised somewhat because the proposed tax was too great and too frequent. It has been criticised more as being too small and not frequent enough. In his opinion, if changed at all, it should be increased both in amount and frequency. "The grant, in any case, is a tax upon or a deprivation to the public, and should not be perpetuated unless it is worth a good fee.'

We find no further reference to this section in Mr. Raymond's argument,

Mr. Hyde's friendship for the patent system as a whole is unmistakably genuine, and the same may be said of the rest of the list. His approval of the proposed amendment is based on its power to weed out "worthless patents that are lying about for speculators to pick up and use to the annoyance of subsequent successful patents. There is growing up," he says, "a class of men who, when they find an invention in successful use, go to the Patent Office and rake over all the patent files to see if they can find an old patent which will supersede the later successful one, and then buy it up for a nominal sum. After obtaining a reissue, if needed, they commence an onslaught on legitimate business." Section 11 would put an end to this nefarious business by killing perhaps 75 per cent of the patents issued.

Mr. Storrow's approval was based on the ground that undeveloped patents are a hinderance, not a help to progress. "If the invention at once takes place in the arts as a practical thing, or if it so clearly embodies a great step forward that the inventor or others are incited to develop it to a practical and pecuniarily profitable application, it constitutes a progress, and the purpose of the law is satisfied. But features are often patented which are afterwards found neither to be useful nor to hold out hopes of usefulness enough to lead to attempts to improve them. A subsequent inventor making a truly useful machine unconsciously uses one of those features and the patent stops him; it does not promote the progress of the useful arts that such a patent should live merely to hinder and not to constitute progress." The periodical fees will weed out such undeveloped inventions, to the great advantage of meritorious inventors and to the public. The result of a severer provision in England, Mr. Storrow goes on to say, "has been that the average life of a patent has been shortened from fourteen to about four years; we think that this section will shorten it from seventeen to about eight years, and it will not diminish the stimulus to invention, because it will only cut off those which after trial have been practically abandoned as worthless."

easily managed and guided swift aerial ship carrying nitroglycerin torpedoes would be a terrible enemy.

Experiments with Floating Magnets.

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How it is formed. Remedies.

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ARNOT, F. S. Lecture VI. Various classes of Paper and their characteristic differences. Determination of Ash or Loading. Water Supply. General arrangement and construction of the Mill. These Lecture VI. Technology of the Paper Trade. By WILLIAM

Mr. Smith thought that under the operation of the infit period and half of the remainder at the end of the first period and half of the first period and half of the remainder at the end of the first period and half of the remainder at the end of the first period complaint," he said, "that old patents which have been idle and worthless in the hands of their owners have often been revived so as to cover subsequent patents and the industries which have grown up under them. It is certain that a large part of such patents will be swept away under the provisions of this bill. The fees will become payable generally before it is discovered that they can be used to embarrass subsequent inventors or manufacturers who have unwittingly used what might be covered by the reissues; and as they are worthless for legitimate purposes at the time, they will to a large extent be allowed to expire."

> Further on, Mr. Hubbell asked: "If this country has prospered so long and so well, as compared with other nations, under small patent fees, so that we have superseded England, who, under her prerogative right, has taken excessive fees from inventors, why do you want to crush down inventors by exacting fees that will put them in the same condition as they are in England?"