Scientific American.

ESTABLISHED 1845

MUNN & CO., - - - EDITORS AND PROPRIETORS.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, - - NEW YORK.

TERMS FOR THE SCIENTIFIC AMERICAN.

(Established 1845.)

One copy, one year, for the U. S., Canada or Mexico.....$3.00
One copy, six months, for the U. S., Canada or Mexico..... 1.50
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MUNN & CO., 361 Broadway, corner Franklin Street, New York.

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(Established 1876)

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NEW YORK, SATURDAY, JULY 17, 1897.

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(Illustrated articles are marked with an asterisk.)

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Scientific American Supplement

No. 1124.

For the Week Ending July 17, 1897.

Price 10 cents. For sale by all newsdealers.

IMPROVEMENT OF THE ENTRANCE TO NEW YORK HARBOR.

There is a growing conviction among those who are interested in the welfare of the Port of New York that it is imperative that something be done to improve the entrances to the harbor. At present, entrance is made through a thirty-foot channel which is partly natural and partly artificial. This is known as the main ship channel, and the minimum depth of thirty feet is only maintained at the cost of continuous and very expensive dredging. From the thirty-foot line outside Sandy Hook it runs in a westerly direction for about six miles to a point about a mile and a half inside the Hook, where it turns abruptly to the north.

This sharp turn is a source of anxiety and danger to shipping, especially in foggy weather; moreover, the dredged channel is subject to continual silting up by the matter which is washed into it from Raritan Bay; and furthermore, its width is not sufficient to allow safe navigation when a large number of incoming and outgoing ships are meeting in the channel. To the east of the main channel are the Swash channel, the East channel and the Coney Island channel. These are considerably shallower and are used by ships of lighter draught than the large ocean-going boats.

The latest plan of the many which have been proposed for the improvement of the harbor entrances proposes to abandon the present main channel and dredge out two separate and shorter channels to the eastward, on the line of the present East and Coney Island channels. The East channel lies to the east of Romer Shoals, a permanent bank which intercepts the silt coming out of Raritan Bay, and affords a natural protection to this channel. It has a depth of thirty feet for about three miles of its length, and only about two miles would have to be dredged out to open a thirty-foot channel clear through to the sea. The proposed Coney Island channel would extend from Norton's Point to deep water and necessitate about four miles of dredging. The dredging in the new channels would be carried down to a depth of thirty feet, and as they would both be protected from silt by the Romer Shoals, it is reasonably supposed that there would be no difficulty in maintaining the required depth of water.

The advantages of having two separate channels for outgoing and incoming ships are many and obvious, and chief among them would be the lessened risk of collision. It has been pointed out that, if a modern liner, with her two hundred yards or more of length, were to be sunk across the present channel, the Port of New York would be practically shut up until she could be floated or the wreck removed. The possession of an alternative channel would remove this possibility, as, with proper care, the remaining channel—in case of such obstruction—could be used by both outward and inward bound ships.

Now that the question of improvement is being actively agitated, it would be well to consider the advisability of adopting a greater depth than thirty feet as the minimum that shall be maintained from the docks to the sea. The rapidly increasing size and draught of the latest ships is already taxing the capacity of the present channels. The big freighter Pennsylvania is reported to have left for Europe on a recent trip drawing over thirty-one feet of water, and it is morally certain that the large profits which will be realized from this class of vessel will lead to their being built in increasing numbers and probably of increasing size. If, as the engineers predict, the new channels will not be subject to silting up, it would be practicable to maintain them at say a thirty-three or thirty-four foot depth without any material increase in the cost.

THE THIRD RAIL SYSTEM IN ENGLAND.

The latest addition to the system of underground railways in London will probably rank as the most important of all these lines before it has been very long in operation. It will be known as the Central London Railway, and, starting from the busy Liverpool Street Station in the City, it will run by way of Holborn and Oxford Street, along the northern side of Hyde Park to Shepherd's Bush, a distance of six miles and a half through the busiest part of London. The road will be about sixty-five feet below street level, and will be carried in two separate and parallel tunnels—a similar plan to that adopted in the Southwark underground railway in the same city. Each station will be served by two elevators and two stairways.

The new undertaking will have especial interest for this country, from the fact that the electrical equipment of the road itself and of the extensive system of elevators by which it will be served will be furnished by American firms.

The third rail equipment will be put in by the representatives in England of the General Electric Company—the British Thomson-Houston Company. It will be similar in its general outlines to that which was employed by the General Electric Company on the New York, New Haven and Hartford Railway, and illustrated in the SCIENTIFIC AMERICAN for June 12 and 26.

The conductor will consist of an insulated third rail, placed on the ties between the main rails. The service will differ from that on the New Haven line, however, in that the trains will be hauled by separate electric locomotives, whose general appearance will conform to the well known heavy locomotives which are being used in the Belt line tunnel, at Baltimore. On the New Haven line, it will be remembered, the motor cars have full accommodations for passengers. The change is made to accommodate the reduced clearance of the tunnels. Equally interesting will be the extensive elevator equipment. There will be forty-nine in all, and they will be of the well known double drum Sprague type. Their capacity will be 100 passengers per trip, or a load of about 15,000 pounds.

It is very gratifying to note that the whole of the electrical equipment of such an important work in the capital city of the world has been secured by two American firms, and the fact is a direct tribute to the high character of electrical work in this country.

THE MOORE SYSTEM OF VACUUM TUBE LIGHTING.

The Moore system of electric lighting by means of vacuum tubes has received very material benefit from the inventor's latest improvement, which consists in the use of a rotary current interrupter in place of the vibrating current interrupter which he formerly used. With the latter it was only possible to obtain about 6,000 breaks a minute; but with the rotary device it is possible to obtain as many as 50,000 breaks in the same time. The rotator consists of a revolving commutator which carries a series of brushes. The segments are arranged on the periphery of a rotating cylinder which is inclosed in a vacuum tube together with the armature of the motor which drives the commutator cylinder. On the outside of the tube are placed the field magnets which influence the armature. The substitution of the rotator for the vibrator enables a number of tubes to be operated together, whereas formerly it was necessary to provide a vibrator for each tube. There is also the advantage that for a given volume of light the consumption of electrical energy is much less than it was with the vibrating device.

THE ARMOR PLATE COMPROMISE.

It must be confessed that the so-called armor plate compromise seems to give the manufacturers pretty much everything they have asked. At any rate, it has shown the absurdity of the attempt to limit the rate which should be paid for armor to "$300 per ton of 2,240 pounds." It will be remembered that this price was rejected by the Bethlehem and Carnegie Companies, and that the subsequent increase to $400 per ton failed to meet with favorable consideration. As a last move the Naval Committee has agreed to fix the price at $425 per ton, and a provision has been incorporated in the General Deficiency bill which will cover the necessary appropriation. Action of some kind had to be taken, for the three battleships for which the armor is to be provided had advanced to a stage of construction where the government ran a serious risk of having to pay heavy penalties for delay in furnishing the armor.

It looks like a distinct concession to the manufacturers that the turrets have been changed from the elliptical to the cylindrical type. We presume this was done because of the greater ease and cheapness of manufacturing the plates for a cylindrical turret. This change may be acceptable to the maker, but it is a positive loss to the ships. The elliptical turret is lighter for its efficiency than the older type and gives a better distribution of weight.

THE INACCURACY OF ARTILLERY FIRE.

If we turn from the official lists of the guns carried by the navies of the world and look at the records of gun practice in these very navies and with these same guns, the effect is almost comical and certainly very surprising—so greatly are these terrific engines of war robbed of their power by the hands of unskillful gunners. According to some figures quoted in the Naval and Military Record, the artillery practice in the English navy—or a part of it—during 1896 was, to put it mildly, shockingly bad. Thus we are told that the Sanspareil, a sister ship to the ill-fated Victoria, fired seven shots from her huge 110 ton guns, every one of which missed the target. Now this giant gun is credited with awful powers of destruction, and on the proving grounds a test shell did actually tear a hole big enough for a man to creep into through a target of steel, wood, and stone, 42 feet in thickness.

Of what value, however, are these monsters if they cannot be made to shoot straight? The Benbow, which also carries two of these guns, fired six shots, all of which missed the target. The next size of guns, 67 tons, made better practice, scoring six times out of thirty-one shots; though this, in all conscience, was a pitiful exhibition. When we come to the antiquated muzzle loaders it is not surprising to learn that twenty-four shots from the guns of the Inflexible and the Dreadnaught failed, every one of them, to reach the mark. One would have looked for better results, however, from the smaller calibered 10 inch guns of the Thunderer and Sanspareil; but out of thirty-three shots fired by these ships, only two reached the target.