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NEW YORK, SATURDAY, FEBRUARY 27, 1904.

The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

SALT WATER FIRE PROTECTION FOR NEW YORK CITY.

Irreparable as is the loss occasioned by such disasters as the theatre fire at Chicago, and the recent conflagration at Baltimore, it is probable that the ultimate benefit to the general public far exceeds the local blotting out of life and destruction of property, great as it may be—and to this extent, if the sufferers can be so philosophical as to see it that way, they are paying the price for an enormous, never-ending benefit to humanity at large. The great theatre fire resulted in an immediate and sweeping investigation of theatre conditions, not merely throughout the United States, but, as we now learn, in every country in which adequate protection had not already been made against theatre fires. And now the aftermath of the Baltimore fire is seen in the widespread investigation which is being made to ascertain how far other great cities are exposed to the danger of a similar sweeping conflagration, should a fire once get a thorough hold in a congested district. Already there is, even among conservative engineers, a doubt as to the ability of fireproof buildings to act as fire screens, and protect the buildings that are to leeward of them from the onrush of a big city fire, driven by a gale of wind. It is also generally accepted that in the present state of our fire-fighting apparatus, the security of New York depends entirely upon the ability of our very efficient fire department to smother a fire before it becomes a conflagration; and the conviction is growing that, should a conjunction of unfavorable circumstances, such as a heavy fall of snow, a fire in a congested district of old buildings, and a sweeping gale occur, rendering it impossible for our fire department to smother a fire at the outset, it might easily grow to an extent which would render even our admirable New York city force helpless to stop it. Hence the need for some auxiliary system of fire protection, by which it would be possible to flood a threatened district with an immense volume of water.

The system that is finding the most favor is one that has been frequently proposed in past years for installation in New York city. But in this, as in many other advanced municipal improvements, while New York has been talking, the provincial cities have been acting, and Philadelphia is to-day equipped with a system of salt-water mains and powerful pumping plants, by which water may be drawn from the Delaware and delivered in great volume and under high pressure at a fire in any part of the principal business sections of the city. Cleveland also has a similar installation. Here in New York, the configuration of Manhattan Island is extremely favorable to the installation of such a system, and we are much pleased to see that our very wide-awake and capable Mayor has added to the many excellent suggestions that he has made in the few weeks of his term of office, by writing a strong letter to the Fire and Water Commissioners and the Board of Fire Underwriters, recommending that a system of mains be laid through the streets of the downtown portion of the city, and that separate pumping stations be established, thereby giving the city an entirely new and powerful supply of fire-fighting apparatus independent of the present city water supply. There is much to be said in favor of the plan, although the average citizen may well gasp at the contemplation of the widespread tearing up of the streets which will be involved in carrying out such a scheme. If Mayor McClellan's suggestion be acted upon, the work should not be started until the plans are thoroughly matured, and it should then be rushed through with all the expedition that unlimited capital and men can secure.

THE PROPOSED NAVAL APPROPRIATION.

To everyone who is at all familiar with the present trend of events in the design of ships of war, the character of the additions to our navy which are proposed by the Naval Affairs Committee will be in every way satisfactory. There was a division of opinion in the committee as to whether the proposed increase should include a considerable tonnage of fast unprotected cruisers, or less of these and more vessels of the battleship and armored cruiser class. We are gratified to see that the advocates of armored ships prevailed, and that it is proposed to increase our navy by one first-class battleship of 16,000 tons, to cost $7,775,000; two first-class armored cruisers of 14,500 tons, each to cost $6,505,000; and three scout cruisers of not over 3,750 tons displacement, each to cost $2,200,000, and two colliers to cost each $1,250,000. Of the total tonnage of warships thus proposed of 56,000 tons, four-fifths will be heavily armed and armored vessels capable of taking their place in the front line of a fleet engagement. This is as it should be. We have long believed that one ton of displacement in a battleship or heavily armed and armored cruiser is worth more as a determining factor in the issues of war than many tons in unprotected vessels of the cruiser and scout class. It takes but a glance at the list of ships now built and building for the United States navy, to see that we are relatively very strong in armored vessels. Thus, out of a total tonnage built and building of 616,275 tons, 496,000 tons, or over two-thirds, consists of armored vessels, of which more than sixty per cent are first-class battleships.

The new battleship, which will be a sister to the "Louisiana" and "Connecticut," will be one of the largest ships in the world, displacing 16,000 tons. She will have the American characteristic of carrying a heavier battery than any vessel afloat, not even excluding the 16,350-ton British battleships of the "King Edward VII." class. For defense she will rely upon an 11-inch waterline belt, a 4½-inch protective deck, 10 inches of steel on the heavy gun positions, and a broadside protection of 7 inches of steel carried from the main belt up to the main deck. She will mount four 12-inch, eight 8-inch, twelve 7-inch, twenty 3-inch, and twenty-eight smaller guns. This ship will be considerably the most powerful fighting unit afloat. Equally effective in the armored cruiser class will be two new vessels of the "Tennessee" type, of 14,500 tons displacement and 22 knots speed, with a 6-inch waterline belt, and 9-inch and 5-inch protection for the gun positions, carrying four 10-inch, sixteen 6-inch, twenty-two 3-inch, and twenty-four smaller guns. If the 5 inches of side and battery armor had only been 6 or 7 inches in thickness, these ships with their four 10-inch guns in the main battery, would be as much entitled to rank as battleships as do the three vessels of the "Pobieda" class in the Russian navy.

The cruiser scouts will probably be of the new class of boats which was introduced by the "Novik" of the Russian navy, a 3,000-ton scout of 26 knots speed, carrying half a dozen 4.7-inch guns. The "Novik" has been termed the destroyer of destroyers, in recognition of her supposed ability to run down and sink torpedo-boat destroyers. She showed up rather ingloriously at her first opportunity, which occurred recently at Port Arthur, for she was among the vessels disabled in that engagement. The two colliers which it is proposed to build are a type of vessel that is recognized as absolutely essential to the proper mobility of a modern fleet. They are really floating coaling stations, and we look to see a great development of this type in the future.

ELECTRICITY IN MINES.

The departmental committee appointed by the British government to investigate into the subject of the utilization of electricity in mines for the purpose of promoting precautionary and safety regulations concerning the same has issued its report. In this, the committee realize the extent to which electricity will be used in mining, and they favor the alternating current as being the best adapted to the work. They point out the greater safety attending the use of electricity if properly controlled. Concerning the potential of the current employed, they suggest 650 volts as the maximum at the face, but higher voltage in other parts of the mine. The necessity of a first-class installation is emphasized, and they state that electrical power must always be regarded as a powerful danger, and the current switched off and all subterranean machinery instantly stopped upon the slightest detection of gas, to prevent the possibility of explosions, accidents, and so forth, by short circuits, etc.

The general principles governing installations of electricity in mines which the committee suggest are as follows: (1) That explosives should always be treated as a source of potential danger. (2) That explosives and all apparatus connected with their use should be of thoroughly good character, and that all of bad quality should be immediately discarded. (3) That the handling of explosives should be limited to competent persons. (4) That in the case of danger from the presence of gas, precautions should be taken to insure thorough ventilation in order to remove the source of danger, and that no shot should be fired until all gas has been removed. Though we do not wish to imply that the risks attendant on the use of electricity where an installation is properly put in in the first place, and maintained in good order, are comparable to those which are and must be attendant on the use of explosives, at the same time we cannot shut our eyes to the fact that if an installation is not of thoroughly good quality and also maintained in a state of efficiency, it must add one more to the several dangers which it is the lot of the miner to face in his daily occupation. To follow out the above analogy, we think the general principles which should govern the employment of electricity in mines are as follows: (1) The electric plant should always be treated as a source of potential danger. (2) The plant in the first instance should be of thoroughly good quality, and so designed as to insure immunity from danger of shock or fire, and periodical tests should be made to see that this state of efficiency is being maintained. (3) All electrical apparatus should be under charge of competent persons. (4) All electrical apparatus which may be used when there is a possibility of danger arising from the presence of gas should be so inclosed as to prevent such gas being fired by sparking of the apparatus.

With regard to cables, there are special rules for guarding against the introduction of water within the insulating material in damp places; also for the substantial fixing of cables in shafts and for special protection where the cables in underground roads cannot be fixed at least a foot beyond the reach of any tub or tram. Cables, when suspended, are to be so fixed that in the event of a fall they will break away without damaging themselves, and trailing cables for portable machines are to be heavily insulated and armored. A coal-cutting motor is not to be kept continuously at work beyond a maximum time, to be fixed in writing by the superintendent. Current supplied for use on trolley wires with an uninsulated return is to be generated separately and not taken from lines used for any other purpose. Provision is made for the guarding of arc lamps against the possibility of ignited carbon falling. Arc lamps are not to be used when there is dangerous coal-dust. Vacuum lamps alone may be used, inclosed in gas-tight fittings. There is also provision for the supply of safety lamps in case of failure of the light. One section deals with shot-firing. The cable is in no case to be less than 25 yards long and the handle or plug of the firing apparatus is to be detached when not in use. Lighting and power cables are not to be used for firing shots except with the provision of special locked boxes for the firing plug or button.

EMISSION OF N-RAYS BY THE HUMAN BODY, ESPECIALLY THE MUSCLES AND NERVES.

M. Charpentier's discovery that the nerve centers and muscles of the human body give off a special kind of radiation has already been discussed in last week's issue. A few additional details have been sent to us by our Paris correspondent, which go to supplement what has thus far been published. Whatever may be the ultimate bearing of the discovery, the facts alone are of value, and further progress in investigating these phenomena will be watched with interest. The experimenter presents an account of his first work at a recent meeting of the Académie des Sciences.

While repeating in his laboratory some of M. Blondlot's experiments on the production and effects of the N-rays, M. Charpentier had occasion to observe a series of new phenomena which seemed to have considerable importance from a physiological standpoint. One of the most convenient methods of observing the N-rays is to receive them in the dark upon a phosphorescent substance of small luminosity, and the rays show themselves by increasing the light given off by the body. Fluorescent substances answer very well for the test screens, and one of the best methods is to use a platino-cyanide of barium screen whose luminous intensity is regulated by a radium salt covered with black paper and placed at a variable distance. The rays from the radium thus excite the screen and make it more or less brilliant. Such a screen then serves to reveal the presence of the N-rays by increasing in brightness when the latter are allowed to fall upon it.

The phosphorescent or fluorescent screen is found to increase in brightness when it is brought near the human body. The effect is strongest in the neighborhood of the muscles and nerves. Contracting the muscle heightens the effect. In the case of nerves or nerve centers, the phenomenon is shown more clearly as the degree of working of the nerve or center increases. In this way the presence of a surface nerve can be recognized and the path of the nerve can even be followed by exploring it with the test body. These effects are not only observed on contact with the skin, but can be perceived at a distance. The action takes place through substances which are transparent for the N-rays (aluminium, paper, or glass), and it is stopped by screens which are opaque for the rays, such