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THE SENATE AND THE ARMOR PLATE QUESTION.

There is only one thing that is more remarkable than the persistence with which the Senate meddles with technical and professional matters, and that is the invariable and inevitable blunders of legislation which follow this interference. In this respect its record for the past session has been a sorry one. First it undertook to teach our naval experts what kind of ships were needed by the navy, and in flat contradiction to the teachings of the late war, and in spite of the protests of the ranking admiral under whom that war was prosecuted, the Senate committed the country to the construction of four vessels of an antiquated and discredited type. Having delivered itself duly upon this question, the Senate clinched its arguments by willfully robbing not only the principals, but the subordinates among our naval officers, of the very promotions which had been proposed as the just rewards of meritorious conduct during the war. Not content with the rank injustice (we had almost said the gratuitous insult) of refusing to recognize the brilliant conduct of our naval officers, the Senate proceeded to still further make an exhibition of itself by cutting down the proposed appropriations for the navy by one-half—a movement which was only checked by the strenuous opposition of the House in Committee.

When the Senate saw that the House was firm in its demand for the construction of the full number of ships recommended by the Naval Board, it proceeded to gain its end by a piece of political jugglery as disgraceful to the Senate as it is humiliating to the country at large. It agreed to the construction of the ships, but put a proviso into the bill which blocks the construction of the battleships and armored cruisers as effectually as if they had been stricken out of the bill altogether. The Senate authorized the construction of the armored ships on the condition that no contract for their construction should be made until contracts had been let for the construction of their armor at a price of $300 per ton. As it is absolutely impossible for any firm to make modern armor for $300 per ton, it will be seen that the Senate has blocked the construction of these ships more effectually than if their construction had never been authorized.

One grows weary of reiterating the commonplace that there are certain matters for information and instruction regarding which Congress must rely upon the professional knowledge of the various bureaus. While senators and representatives should endeavor to obtain a general familiarity with the affairs of the technical bureaus, no one expects them to become so versed in the various subjects upon which they have to legislate as to be able to discuss the technical questions involved in the recommendations made by the various expert boards. If they do so, they will blunder as foolishly as the Senate has blundered in the instances above quoted.

Take the matter of the cost of armor plate. Nobody can deny that armor at $550 a ton is a costly material; but because the price is high, it does not necessarily follow that the profits are abnormally large. The manufacture of armor plate is one of the most expensive processes known in the art of steel manufacture. It involves the building of an extensive and costly plant of a special type, which must necessarily occupy many months in its erection; and an armor plate company never knows but what new developments in the art may render a large part of the plant out of date before it has turned out a single plate. This element of uncertainty alone justifies the manufacturer in placing a high price upon his finished product, and if he makes the armor plate pay for the periodical and costly renewal of his plant, he is merely protecting his own interests in a perfectly legal way.

Moreover, every increase in the price of armor has been marked by a corresponding increase in the quality of the plate. The Senate is greatly exercised over the increase of $50 to $75 per ton in the cost of the new Krupp armor over the Harveyed armor. Yet the tests thus far made indicate that the Krupp plates show a superiority of about 25 per cent over the Harveyed plates, and, ton for ton in point of powers of resistance, the Krupp material at $550 to $575 per ton is cheaper than Harveyed armor at $475 to $500 per ton. Moreover, in comparing the prices asked by American manufacturers of this government with those being actually paid here and in Europe, we find that there is nothing exorbitant in the demands of our armor plate makers. In England the price of Krupp armor ranges from $515 to $569 per ton. In this country the Cramps are paying the American manufacturers $575 per ton for Krupp armor for the Russian battleship now building at their works, although they were at liberty to procure this armor from any other source. Russia is now buying in the United States the ordinary Harveyed armor at $486 per ton, because this is cheaper than they can procure it elsewhere.

In view of these facts, which have been furnished us from an official source, what, we ask, becomes of the Senate's demand that the armor for our new battleships and armored cruisers shall be furnished for $300 per ton? No manufacturer in the world is going to deliver plates for United States warships at 50 per cent less than the cost of manufacture.

It is no thanks to the Senate that the situation, as regards the vessels just authorized, is not as bad as it seems. It happens that the armor plate makers' hands are so full that no delay will be occasioned in the construction of the new ships, if Congress only rectifies the mistakes of the last session when it meets again in December. The present contracts for the vessels of the "Alabama" class and for a Russian battleship will keep the mills busy until February, 1900. The 10,000 tons required for the "Maine" class and the monitors will not be completed before the summer of 1901, before which time nothing could be done for the new ships. By the time Congress meets, a lot of Krupp armor, now being made for Russia, will have been tested at the naval proving ground and the department will then be in possession of additional information which will enable Congress to understand the armor plate question better and act more intelligently upon it. If the members of Congress will listen to the expert testimony which will then be forthcoming, there will be no difficulty in securing all the armor we need at a figure which will be just both to the manufacturer and the government. But the price will not be $300 per ton.

FIRE PROTECTION OF TALL BUILDINGS.

It will be remembered that when the upper eight stories of the Home Life building were burned out in the recent fire, the chief of the New York Fire Department stated that the failure of the firemen to do any effective work above the ninth story was what he had predicted whenever one of these tall buildings came to be tested by a serious fire. There is a limit of height above which the ordinary methods of fire-fighting by pumping water through a hose are inadequate. Much valuable time is lost in dragging the hose from floor to floor; it is always liable to injury from fire or falling debris; and of course there is the danger of bursting from overpressure, a risk that naturally increases when the water has to be forced to the upper floors of a twenty-story building.

The New York Fire Department has recently made a test of the height at which an effective stream of water can be delivered from its engines, which shows that our tall buildings are better protected than is generally supposed. A fire engine was connected to the mains and to a standpipe that extends the full height of the St. Paul building, and succeeded in forcing a considerable stream of water from the roof—at a height of 307 feet above the street level. With a pressure of 180 pounds at the engine, the water was thrown over St. Paul's Church, on the opposite side of Broadway, and fell into the churchyard beyond, a horizontal distance of about 250 feet. Unfortunately, the failure of one of the couplings on the standpipe within the building prevented the test being made with the maximum pressure at the engine of 300 pounds to the square inch; but enough was done to prove that the engines of the department can deliver water at a satisfactory pressure on any of the floors of our tall buildings. At the time the standpipe failed the engine was throwing over 250 gallons a minute at a height of over 300 feet, with only 60 per cent of the maximum pressure.

While it is true that the tall buildings are provided with their own fire service in the shape of tanks on the roof or special fire pumps in the basement, experience has shown that the system is not very reliable. The tanks are liable to be empty, or the pumps may not be available because of insufficient steam supply in the boilers, or the whole plant may be crippled by the flooding of the basement during the progress of a fire. But by the new system, if a fire should break out in a building supplied with adequate standpipes and a good elevator service, the firemen will be enabled to command a good service of water on any of the highest floors within a few minutes after reaching the scene of the fire.

The failure of the standpipe in the St. Paul building suggests that the fire system of these tall structures should be put in under the rigid inspection of the Building Department; that it should be of ample capacity; and that it should not be passed by the department until it has been subjected to a test pressure considerably beyond that which will obtain in actual service.

A further development of the idea of having the service of these buildings operated by the engines of the Fire Department would be to lay down separate salt water mains at stated intervals from Broadway to the Hudson and East Rivers, with connections at the water front to enable the powerful pumps of the fireboats to be concentrated upon a fire. This system is already installed in some Western cities, and it provides a supply of water far in excess of anything that could be secured by the use of the ordinary fire engines. A combination of both systems and the provision of ample standpipes in every tall building would render these structures practically proof against destruction, so great would be the flood of water that could be let loose upon a fire. It should also be borne in mind that these towering buildings would not only be indestructible themselves, but they would afford an excellent protection against the spread of a conflagration. Their great mass would form an efficient fire-screen, tending to localize an outbreak, while they would serve as giant watertowers, from the upper floors of which a vast amount of water could be thrown upon the burning buildings below.

COAL PRODUCTION IN THE UNITED STATES.

The announcement that the rapid increase in exportation of coal from the United States is causing uneasiness among British coal producers and exporters lends interest to some figures on the coal production of the world, and especially of the United States, just issued by the Treasury Bureau of Statistics. From these it appears that the coal production of the United States is now nearly five times as much as in 1870, that the exportation has in that time increased from a quarter of a million tons to over four million tons, and that the United States, which in 1870 supplied but 17 per cent of the world's output, now furnishes about 25 per cent.

No other country shows such a rapid increase in coal production as does the United States. Great Britain's average annual coal product, as shown by a recent and widely quoted statistical publication of the Swedish government, in the five year period 1871–5, amounted to 127 million tons, and in 1891–5 amounted to 185 million tons, an increase of 45 per cent in the average annual output. Germany's average annual coal product in the period 1871–5 was 45 million tons, and in the five year period 1891–5 was 97 million tons, an increase of 115 per cent. The average annual coal production of France in the year 1871–5 was 16 million tons, and in the term 1891–5, 27 million tons, an increase of 70 per cent. The average annual coal production of the United States in the period 1871–5 was 45 million tons, and in the period 1891–5, according to our own figures, was 132 million tons, an increase of 193 per cent. The average annual output of "other countries" not individually specified was, in 1871–5, 34 million tons, and in 1891–5, 79 million tons, an increase of 132 per cent. The total average annual output of the world in 1871–5 was, in round numbers, 266 million tons, and in 1891–5, 520 million tons, an increase of 95 per cent. Omitting the United States, the annual output in 1871–5 averaged 221 million tons, and the average in 1891-5 was 388 million tons, an increase of 75 per cent.

Both the area of coal production and quantity produced have increased greatly in the United States. In 1870 the number of States in which coal was produced was but twenty, while in 1897 the number was thirty-two. In 1870 the production of anthracite coal was reported only from Pennsylvania, while the census of 1880 reports production in Pennsylvania, Rhode Island, and Virginia, and more recent reports show a production of anthracite coal in Colorado and New Mexico. In the South the increase has been especially rapid. Alabama in 1870 mined but 11,000 tons of coal, and in 1897, 5,262,000 tons. Kentucky, which in 1870 mined but 150,000 tons of coal, produced in 1897, 3,216,000 tons. Tennessee increased her output from 133,000 tons in 1870 to 2,500,000 tons in 1897; and Virginia, which produced but 62,000 tons in 1870, produced 1,365,000 tons in 1897.

PROF. NEWCOMB'S SUCCESSOR.

Prof. Thomas J. See, of Missouri, who was recently Professor of Mathematics at the Naval Observatory, has been designated as Chief of the Nautical Almanac, to succeed Prof. Newcomb, who retired March 12, 1897. Prof. See is already a noted astronomer, although he is only thirty-three years of age. After graduating at the State University at Columbia, Mo., he took the degrees of Ph.D. and M.A. at the University of Berlin and in 1899 took the chair of astronomy in the Chicago University. Later he went to the Lowell Observatory at the city of Mexico and thence to Flagstaff, Ariz. At the last named place he discovered no less than six hundred double stars. Prof. See's discoveries regarding celestial heat have caused some scholars to change their opinion of the nebular hypothesis of Herschel and Laplace.