

and with the Blanco Encalada, built by Armstrong & Company, will show this very clearly.

Table with columns: Displacement (Tons), Horse power, Speed, Protective deck (Inches), Normal coal carried, Armament. Rows include Olympia, Eclipse, and Blanco Encalada.

The great superiority of the Olympia over the Eclipse on every point of comparison cannot be attributed to the extra 200 tons displacement of the former...

The main battery of the Olympia, composed of four 8 inch and ten 5 inch breech loading rifles, is entirely on the main deck. The four 8 inch guns are mounted in pairs in two turrets of Harveyized steel...

The ten 5 inch guns, which are of the rapid fire type, are housed in armored sponsons four inches thick, and are so placed that they give a direct bow or stern fire from four guns and a broadside discharge on either side from five.

The secondary battery, composed principally of fourteen 6 pounder rapid fire guns, is stowed in armored sponsons on the berth deck and along the hammock berthing above the 5 inch guns...

From a commanding position just abaft and above the forward turret, the commanding officer, incased by five inches of nickel steel, will bring his ship into action; and the most modern means of communication bring every important point within immediate touch.

The principal dimensions are:

Table of dimensions: Length on water line (340 feet), Beam, extreme (53 feet), Draught, mean (21 feet 6 inches), Displacement, normal (5,800 tons), Coal supply, normal (400 tons), Coal supply, bunker capacity (1,093 tons).

The vessel has twin screws, each shaft being driven by its own vertical, triple-expansion engine. While not admitting strictly of comparison, the Olympia and the Minneapolis have engines individually alike...

The contract called for only 13,500; and the difference between that and the trial result is indicative of the wide margin of safety reserved by the government and upon which the contractors, at their own risk, are willing to encroach when a premium of \$50,000 is placed upon every quarter knot of speed in excess of contract requirements.

Miscellaneous Notes.

It has been suggested that the boards of health of large cities require the wheels of all milk wagons to be equipped with rubber tires.

A car load of redwood has been recently sent to Nuremberg, Germany, for use in making lead pencils. California redwood and cedar are about the only woods used in the manufacture of pencils...

The Albert Levy prize, of the value of \$10,000, has been awarded by the Academy of Medicine to Drs. Behring, of Berlin, and Roux, sub-director of the Pasteur Institute in Paris, for their discovery of the means of curing diphtheria.

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NEW YORK, SATURDAY, MARCH 21, 1896.

Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles and their page numbers, including Acetylene apparatus, Iron and steel production, and various scientific notes.

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 1055.

For the Week Ending March 21, 1896.

Price 10 cents. For sale by all newsdealers.

Detailed table of contents for the supplement, listing sections I through XII with sub-articles and page numbers.

STABILITY OF LOFTY BUILDINGS.

Although the exaggerated vertical proportions of the modern office building render it, architecturally speaking, somewhat grotesque, there is no doubt but that the steel "skeleton" system upon which it is built provides all the necessary rigidity and strength.

The vibration of lofty buildings has ever been a favorite theme with those who write in the field of engineering romance.

The party who, not so long ago, gravely assured the public that the lantern at the top of the Eiffel Tower swept to and fro through an arc of ten feet, in response to the fiercer gusts of a storm, was shortly afterward followed by another writer, whose pen, more given to fluency than to fact, wrote down a detailed account of the vibrations of a certain well known office building.

That tall factory chimneys do sway to and fro in a high wind, and that a poorly constructed building will rock, can be proved by careful instrumental tests, and in extreme cases the motion can perhaps be detected by the eye, but the frequency and extent to which such movements occur has been vastly exaggerated.

It would be natural to suppose that the elasticity of the steel framework of a fire proof building would allow of a certain amount of "give" or spring, under the severe bending stresses to which it is subjected by wind pressure.

We have been favored with the result of an instrumental test, which was recently carried out on the twenty-first floor of the American Surety building, Broadway, New York, by the engineer and superintendent of the building, Mr. J. Turner. It was made during the height of the heavy storm which prevailed during January 4, when an official wind velocity of 82 miles per hour was registered in the neighboring station.

We confess to some surprise at this practically absolute rigidity; for the absence of any building on the opposite side of Broadway, and, indeed, on that part of the whole block which lies immediately in front of the Surety building, makes it certain that practically the full height, from curb to coping, was exposed to the shock of the storm. Just how great was the bending strain set up within the building is a matter of easy calculation. The front exposed to the wind is 84 feet 8 inches wide by 314 feet high, giving a total of 26,585 square feet.

This gives a pressure on the whole front of 332 tons; and a bending or overturning moment of over 52,000 foot tons. These figures give us an impressive idea of the solidity of a construction which proves to be quite insensible to such powerful disturbing forces.

REPORT ON THE PLANS FOR NEW YORK RAPID TRANSIT.

The Supreme Court Commission, consisting of Frederic R. Coudert, George Sherman, and William H. Gelshehan, which was appointed to examine and pass upon the plans of the New York Rapid Transit Commission, has reported unequivocally in favor of the construction of the underground railroad on the lines proposed by Engineer Wm. B. Parsons.

It is evident, from the general tone of the report that they have judged the question as to whether the tunnel should or should not be built from the standpoint of general expediency, having in view the greatest good of the greatest number. The question which the commission set itself to answer was, whether the necessity for increased transit facilities existed and, if so, whether the proposed scheme would meet the necessity, and confer a public benefit upon the city.

which would outweigh any possible temporary or permanent disadvantages which might attend its execution. They decided that the necessity exists, and that the benefit conferred upon the public at large will vastly outweigh any temporary and local inconvenience. With regard to the discrepancy between the estimate of \$50,000,000 for the total cost by Mr. Parsons and the \$80,000,000 estimated by engineers who testified for the protesting property owners, the report says: "In the view of your commission, it is not necessary to determine whether the road will cost \$50,000,000 or \$90,000,000. We are convinced that, if the road can be built at a reasonable cost, it ought to be built. We are equally convinced that we can never know whether it can so be built until an opportunity is given to competent contractors to say whether they will or will not undertake the construction of the road."

Regarding the encroachment by the tunnel upon the sidewalk vaults and the question of possible damage to existing structures, the commissioners say: "We think that this is one of the cases where the public interest cannot be barred in its progress by any regard for persons where a violation of the law is not involved. If the owners have no law in their favor, and if the public convenience demands that the vaults shall be taken, the hardship of the case cannot be suffered to interfere: the demands and the comfort of 2,000,000 people must be heeded."

Regarding the apparently all important question as to whether the roads would pay, the commission sees no reason to doubt that they will. "Our invariable experience," they say, "thus far has been that the facilities for transit never increase so rapidly as to meet the growing necessities of travel." The commissioners are prepared to admit that when the road is built travelers may at first be prejudiced "against a system which compels them to go down a long flight of steps and to hide themselves from the sunshine and the open air for a given length of time." In regard to this objection, we have already pointed out in a previous issue that it would probably exist at the outset; but we are, at the same time, of the opinion that, if the tunnel could be built and the proposed speed of operation maintained, the New York public would ultimately smother its sentimental objections in the face of the solid practical benefits which such a scheme would bestow.

The strong indorsement of the rapid transit scheme by a commission of such great ability and high personal character is certain very materially to hasten its execution; but it seems likely, on the other hand, that the legal complications in which the opponents of the Commission will endeavor to involve the proceedings will bring about a delay which may prove to be of considerable duration. When the legal objections have been swept away (supposing, as the commission consider, that they are invalid), there will remain a period of five years which must elapse before the roads can be put in operation.

Pending the arrival of the day of opening, which may possibly be six or seven years distant, what provision is to be made for relief of the existing overcrowding, not to mention the additional increase in travel which is certain to take place in each year of the interim? We understand that the Rapid Transit Commission invited the elevated roads to make a statement as to what they were prepared to do in the way of extension; but although they appeared before the commission of 1891, at the present writing they have made no application or response to the existing commission of 1894.

As far as the needs of the public are concerned (and the special commission is right in stating that this is the first consideration), the extension of the existing elevated roads, and the construction of the Broadway tunnel, should be regarded as parts of one general scheme. A scheme which contemplates the provision of the New York lines of travel with ample seating capacity at all hours of the day must necessarily embrace both enterprises. From 1884 to 1893 the travel on the elevated roads increased 250 per cent, and this in spite of the fact that in the same interval there was a rapid increase in the travel upon the competing surface roads. Statistics show that the rate of travel increases faster than the population; that is to say that not only are there more people to travel, but each person takes more trips each year than he did in the year preceding.

It should be borne in mind that in estimating the probable needs of the future no calculation can be considered reliable which is not based upon seating capacity. Statements of the number of people which a road can carry from a given station in a given time are often worthless, for the reason that 30 or even 50 per cent of this number may be standing passengers.

If to-morrow the elevated roads and the Broadway cars were obliged by law to hang out the French sign "Complet," as they do in Paris, when all seats were filled, what would become of the morning and evening travel? Yet the passage of such a law would be merely the recognition of the right of a passenger to demand that the transportation companies shall live up

to their contract and give him the seat for which he has paid. In estimating the future transportation necessities of New York, provision must be made for the greatly enlarged accommodation which the operation of this law will demand.

A NEW COPYRIGHT BILL.

At a meeting of the executive committee of the American Publishers' Copyright League, the following resolutions were presented and adopted:

Resolved, That the American Publishers' Copyright League disapprove, on the following grounds, of the provisions of the bill introduced in the House of Representatives by Mr. Treloar (H. R. 5,976) for the revision of the copyright law:

1. The bill provides for the restriction to "citizens of the United States" of the privilege of securing copyright under the statute. The act of 1891 extended the privilege of securing copyright within the United States to the citizens of foreign states which conceded to American citizens the benefit of copyright. The act of 1870 had limited the privilege of securing copyright to persons who were "residents" of the United States. The restriction now proposed, limiting the copyright privilege to citizens, would bring about a revocation or cancellation of the copyright relations which have been entered into by the United States under the act of 1891 with Great Britain, France, Germany, Italy, Belgium, Switzerland, Spain, Portugal and Denmark, and would constitute a distinct step back of the policy of even our most primitive copyright laws in the recognition of literary and artistic property.

2. The bill provides for the addition to the list of articles which, in order to secure the privilege of copyright in the United States, must be wholly manufactured within the limits of the United States, of musical compositions, and of reproductions of works of art in the form of engravings, cuts, or prints. In the discussions of the provisions of the act of 1891, it was held by those having expert knowledge of the subject that the application of the manufacturing requirement to the production of foreign musical compositions would in practice prevent such composers, in the majority of cases, from securing the benefit of American copyright, and would simply perpetuate the practice previously existing of the appropriation by American reprinters of the property in such productions. It was further established, during this discussion, that a condition requiring the manufacturer production in the United States of an engraving of a work of art by a foreign designer must, in the majority of instances (and particularly in the cases of the more important works of art which could not be brought across the Atlantic for the purpose of being engraved), render impracticable the securing of American copyright, and would leave open, as heretofore, the property in such reproductions to be appropriated by unauthorized publishers.

In connection with the difficulties in the way of securing simultaneous publication in the United States for editions of Continental books printed in the language of the country of their origin, the authors of France, Germany and Spain have thus far received but inconsiderable advantage from the American copyright act, although the several nations which have entered into copyright relations with the United States have extended to our citizens, without any restrictions of local manufacture, the full copyright privileges enjoyed by their own citizens. This result has naturally brought about, on the part of the nations referred to, a large measure of dissatisfaction with their copyright relations with the United States, and these relations would before now have been terminated (greatly to the disadvantage of American authors and artists) if it had not been for certain advantages secured under the act of 1891 to the foreign producers of works of art. If the protection of American copyright is to be withdrawn also from the productions of foreign artists (as would be the result under the Treloar bill), international copyright relations between the United States and the nations above specified will inevitably be brought to a close.

3. The provision in the bill under which the total amount to be collected for the infringement of the copyright of a literary production is limited to \$5,000 is inequitable in itself, and constitutes a distinct departure from the principles heretofore controlling the law of copyright throughout the world. An unauthorized reprinter might easily secure, through the appropriation of copyrighted work, proceeds which would enable him to pay such a penalty as that provided for, and still secure a satisfactory return from his undertaking. The penalty should be left, as under the present law, proportioned to the extent of the injury caused to the owner of the copyright, and proportioned also to the proceeds secured to the person appropriating the copyrighted property, which proceeds have been diverted from the rightful owner.

4. The plan for instituting the office of Commissioner of Copyrights, in our judgment, be dealt with more effectively in a separate bill, such as has already been introduced in the House by Mr. Bankhead and in the Senate by Mr. Morrill. It is further our opinion

that the staff provided under the Treloar bill for the Copyright Bureau would be unnecessarily large and expensive, and that the services of so many employes would probably not be required, at least during the earlier years of the operation of the office.

5. The purpose expressed in Clause XXVIII of the bill for securing adequate protection for the property rights of dramatic authors can also, in our judgment, be better brought about under the provisions of the Cummings bill now pending in the House of Representatives.

For these several considerations it is our judgment that the enactment of the Treloar bill would constitute a serious injury to the rights of producers of copyright property and to the interests of the community for the use of which such copyright property is brought into existence. It would further constitute, on the part of the United States, a breach of international good faith with the several nations of Europe that have extended copyright privileges to American citizens. We therefore ask that the bill may receive the unfavorable action of the Congress and of the executive.

A resolution was passed, however, approving the bill in the House by Mr. Bankhead and in the Senate by Senator Morrill for the establishment of a separate bureau for the registration of copyrights.

Spain's Big Meteorite.

In our issue of February 22 we called attention to the bursting of a great aerolite over Madrid on February 10. The Spanish newspapers have now reached this country and give full details of the event. This phenomenon is seldom observed on so startling a scale. The sky was cloudless, the streets were just beginning to be thronged with traffic and pedestrians, when the deafening sound of the explosion was heard. Those who happened to be looking at the sky say that the instant of the explosion there was a vivid glare of blinding light that for the moment outshone the sun, and then there instantly appeared at the place where the disturbance originated what looked like a cloud of white and bluish tint, bordered with red, which moved east at a tremendous rate, leaving behind a thin train illumined by the sun that may have been dust particles. The whole city appeared to be shaken as if by an earthquake, and the agitation of the atmosphere was shown by the rapid fall and rise of the barometer. The terror inspired by the occurrence was very great, particularly among the ignorant and superstitious. Many people did not recognize the origin of the phenomenon and thought some terrible catastrophe had occurred. The energy of the disturbance probably equaled that of the explosion of a large powder magazine. Many windows were shattered and walls injured, but fortunately no one was killed. The aerolite was visible over at least three-fourths of Spain as it shot through the air above the peninsula. Some damage was done at places along its route, for the great meteorite partly disintegrated on its way and the incandescent fragments that showered upon the town of Lograno set two buildings on fire, and at Burgos three fragments fell among the houses. Other pieces of the stone that were flung off near Madrid were picked up while still hot.

The Marvels of an Ostrich's Stomach.

The post mortem examination of one of the flock of ostriches owned by Barnum & Bailey, which has been on exhibition at the Central Park menagerie, New York City, gave the spectators a wonderful object lesson of the digestive capabilities of an ostrich. The ostrich was dissected by a taxidermist. He found the following articles in the bird's stomach: One wooden clothes pin; the bottoms of two beer bottles; a mouth harmonica, five inches long and two inches wide; a ferrule of an umbrella with a piece of the stick in it about four inches long; a metal skate key; a brass door key, five inches long; a woman's black horn comb; two pieces of coal; a woman's silk handkerchief; three stones about an inch thick, together with some cabbage, grass, lettuce, celery and considerable dirt. Strange to say, the ostrich did not die of indigestion, but from tuberculosis. The bird will be mounted in the museum and it would be interesting to preserve alongside the collection of objects which was found in its stomach.

Lieut. W. C. Babcock, U. S. N.

Lieut. Babcock, executive officer of the U. S. revenue cutter Michigan, died of pneumonia at the University Club, New York, on March 11. He was born in Vermont, in 1853, was graduated at Annapolis in 1871, and from that time had been continuously in the naval service. He served under Capt. Rogers, inspector of this lighthouse district, and was largely instrumental in establishing the electric light buoy system of New York Harbor, which was illustrated and described in the SCIENTIFIC AMERICAN last week. The disease of which he died was of but ten days' duration, and was contracted while doing compass duty.