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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.

## TITLE TO THE PANAMA CANAL.

We learn that the Cabinet of the President, at its weekly meeting on July 1, referred the matter of this government's securing a satisfactory affirmation of the sufficiency of title to the property of the New Panama Canal Company to the Attorney-General; and it is probable that he may endeavor to secure from the French government through the Chamber of Deputies a legislative resolution which shall effectually affirm the legality of the acquisition of the canal by the United States.

There is good reason to believe that informal preliminary assurances have been received from the French government that everything will be done that is necessary to assure a perfect title. It is also expected that the Attorney-General will have access to the records of the French courts bearing on the subject, and authorization from them to secure from a higher tribunal further evidence on the sufficiency of title. The continued friendly feeling between the two governments is certain to dispose of this vital question at an early date in a manner satisfactory to the President.

We trust that the treaty negotiations which are to be undertaken with Colombia will meet with such encouragement that the preliminary arrangements will be completed by the beginning of next year. The President and Cabinet are to be commended for acting so promptly in carrying out the provisions of the law on this most urgent question.

## SOLUTION OF THE BRIDGE TERMINAL PROBLEM.

Among the many plans that have recently been submitted for overcoming the crowded conditions of street car and elevated railway travel at the Brooklyn Bridge terminal, by far the most simple and effective is that which has just been proposed by William Barclay Parsons, Chief Engineer of the Rapid Transit Commission, at a recent meeting of that body. The terrible congestion at the City Hall center is due to the fact that three great systems of railroad travel meet at the entrance to the Brooklyn Bridge, and unload their passengers to swell the crowds that find their way on foot during the rush hours to the same point; in other words, the congestion is traceable to the fact that at this most important point, instead of an unbroken system of travel, converging to the bridge and passing over it without any transfer of passengers, there is a terminus of extremely limited accommodations. Evidently, the way to relieve the congestion is to break it up by removing the cause.

We have recorded, from time to time, the various plans which have been offered as a relief to the present conditions. The first one, suggested by a special commission of engineers, proposed to extend the trolley tracks northward on Manhattan Island to the other new East River bridges which are under construction, and southward to important connections further downtown, and the plan proposed would certainly have relieved the crowding. But it was radically wrong in its suggestion to carry these tracks on elevated structures, and so add to the serious disfigurement and obstruction to traffic afforded by the present elevated railways.

Mr. Parsons is convinced that any future additions to the railway system of this city must be made underground, and he proposes to secure all the advantages and avoid the drawbacks of the plan just referred to, by making connections between the present bridge and the new bridges and with the district below City Hall Park by means of subways. The proposal, briefly stated, is as follows: Commencing at the Manhattan anchorage of the Brooklyn Bridge, he would depress the railroad tracks, carrying them down on a grade of 4.5 per cent, until they reached the level of the subway tracks which are now under construction. The tracks would enter a great central, underground station, which would be available for both the present subway tracks and those which it is now proposed to bring below ground from the bridge. Here the tracks

would swing to the right and to the left, some of them passing in a subway below Center Street, to a junction with the Williamsburg and Manhattan bridges, while others would be carried in a subway below Nassau Street to Maiden Lane, where they would again swing to the left to pass in a tunnel beneath the East River to Brooklyn. By this arrangement it would be possible to maintain a constant circulation of cars from Brooklyn to Manhattan Island by the present bridge, and from Manhattan Island back to Brooklyn by way of the two new bridges and the proposed Maiden Lane Subway and tunnel. The present congestion would by this arrangement be entirely relieved. Incoming and outgoing passengers would no longer crowd to a single point; since the former would alight, some of them, at City Hall Park, and others at the various points in the new subway which are nearest to their destination; while the outgoing passengers would, a large proportion of them, take the Brooklyn cars at various points on Manhattan Island, and only a limited number would walk to the present bridge terminus.

The carrying of the tracks below grade will, of course, remove the necessity for the present Brooklyn Bridge terminal station, and this unsightly structure it is proposed to remove and erect in its place a large municipal building, whose architecture will harmonize with the buildings in the vicinity. We are glad to note that on the presentation of this scheme to the Rapid Transit Commission it was heartily endorsed by all the members of that body. The estimated cost of this work being only \$2,752,000, it will be seen that because of the heavy damage costs which would be necessary if elevated structures were built, the proposed trolley subway would be a very much cheaper construction; while its advantages, because of the large union underground station which would be built at the bridge, and the absolute freedom from interference with traffic, to say nothing of the avoidance of any further encumbering of the streets with unsightly elevated structures, render it by far the most practicable scheme yet presented for the solution of this important problem.

## SCIENCE IN AMERICA.

From time to time, the status of pure science in America is made the subject of more or less acrimonious discussion. One of the most trenchant opinions which has been delivered in some time on the subject, comes from the pen of Prof. Carl Barus, of Brown University, who writes in a recent number of Science with a candor that is refreshing.

Among other things, our self-distrust is sharply criticised. We are not quite certain that we have among us a great savant until we are told so by foreign scientists. Contrasting the reception accorded to a German scientist in Germany and a French scientist in France, it must be confessed that we treat our own men rather shabbily. Whenever he reads a scientific paper before some learned society, the German chemist or biologist, figuratively speaking, takes off his hat to the work of his countrymen. The Englishman waxes enthusiastic over results achieved by British men of science, and a Frenchman will pay many a graceful compliment to some scientific compatriot who has worked in the same field. That science should know little or nothing of patriotism may be true enough. The pessimistic Schopenhauer even went so far as to declare in his clever, bitter way that patriotism in science was but another form of bigotry.

But if American scientists should not flaunt the stars and stripes in the face of the foreigner, yet they should at least take a certain pride in what their countrymen have accomplished. For Americans the aristocracy of science resides in England, although it cannot be denied that the Continent too has its attractions. Prof. Barus tells us that our scientific men are apt to outgrow first the American Association, then the National Academy, and finally even their own country.

All this may seem to point to a well-devised scheme of gradation. But the question arises: Can we ever hope to reach intellectual maturity in the eyes of the world if we belittle the dignity of our own institutions? Self-confessed incompetency, says Prof. Barus, may be a virtue, but one should at least first be sure that the incompetency really exists. Although we cannot agree with the Professor in believing that if Europe were to close her gates to American scientific research, no greater blessing could befall us, we do believe that American achievements in scientific research should receive as full a meed of recognition in this country as they do in Europe.

## THE "BLINDNESS" OF THE SUBMARINE.

In 1899, the largest of all submarine boats, the "Gustave Zédé," successfully withstood her first trial. The results were so satisfactory that French naval architects immediately and enthusiastically advocated the introduction of submarine craft in the French navy. Even the public showed unusual interest in the construction of these new vessels; for the Paris

newspaper, *Matin*, received subscriptions sufficient in amount to pay for the two boats, "François" and "Algérien." M. Lockroy, Minister of Marine, who traveled through Germany for the purpose of studying German industries, was one of the strongest advocates of the submarine boat after the "Gustave Zédé" had been placed in commission. In the Chamber of Deputies he advocated with all his ardor the building of submarines, maintaining that "once the submarine boat was blind, but now it can see." That statement must be taken with the proverbial grain of salt. Indeed, naval officers have time and again complained of the blindness of submarine boats. For that reason it is not to be wondered at that many attempts have been made to provide eyes for the new vessel.

The exact nature of the provisions that have been made have, of course, been kept secret. Indeed, every new piece of machinery that is introduced in the submarine boat is carefully concealed from the inquisitive intruder. At all events, it is quite certain that the first suggested plan of using searchlights, to dispel the submarine darkness, is not practicable, for the reason that the rays of light illuminate but a small portion of the vessel's course. Some years ago, during the diving experiments with the "Goubet," a French journalist was said to have been engaged for the purpose of bringing home to the French people the terrible efficiency of the new craft. He performed his task with startling success. He described how easily the boat sank beneath the water and rose again to the surface; how easily it was guided, and how comfortable were its accommodations. It is true that the boat never journeyed for any distance; that no torpedoes were launched, nor that any other offensive virtues were developed. But one phenomenon at least he described truthfully. He positively asserted that nothing could be seen from the interior—nothing but a mass of water.

Instead of using searchlights which would be of service only for such submarine vessels as are employed for wreckage purposes, optical instruments are provided. But these instruments must of necessity protrude from the water. That circumstance in itself is a sufficient proof of their untrustworthiness. Water is wet; and wet lenses can hardly produce clear images. The sea is almost always agitated. Even the smallest ripples may be sufficient to destroy the serviceability of the instruments used.

The optical apparatus to which we refer, and which may be generally termed "périscopes," are not by any means very recent inventions. They are almost as old as the submarine boat itself. Their efficiency has ever been doubted in all countries except France. The daily press is chiefly responsible for the exaggerated praise that has been lavished upon them; and the press accounts, in somewhat diluted form, to be sure, have filtered into the technical papers. A French technical journal, for example, publishes in a recent number an article that bears the title "La Vision dans les Bateaux Soumarins et les Submersibles." No less than six instruments are described, which are catalogued as follows:

1. Lunette de Drzewiecki.
2. Périscope du Colonel Mangin.
3. Périscope du Commandant Darrieus.
4. Lunette de M. Romazzotti.
5. Lunette de MM. Garnier et Romazzotti.
6. Lunette de Daveling et Violette.

Of these, the first is preferred; for the paper in question assures us that "this system is exceedingly simple, and is perhaps the best." In commenting on the apparatus, it may be skeptically remarked that the arrangement is certainly simple—so simple that its efficiency may well be doubted. The original description of this instrument reads: "Elle est composée d'un tube ayant à chaque extrémité un prisme droit à reflexion totale. La lunette coulisse dans un presse-étoupe. On peut la faire rentrer ou sortir du navire et, de plus, en la faisant tourner autour de son axe, on parcourt tout l'horizon." The description is certainly meager enough. No sketches are given. It is furthermore stated that the instrument is only five centimeters in diameter, and that only one eye can be used in viewing an object. Even in France this "best" optical instrument for submarine boats has been criticised; for the article concludes: "We believe that the most practical instrument would be the two-prism apparatus of Drzewiecki, provided it could be given a length of 50 centimeters and a diameter of 15 centimeters. The angle of vision would then be about 18 degrees instead of the present 4 degrees." The images are said to be clear. The inventor, Drzewiecki, is a Russian who first made his appearance in France during the nineties.

The other instruments of the list are similar in character. Mangin's périscopes is 1 meter long, 30 centimeters in diameter and produces reduced distorted images. The instrument invented by Commandant Darrieus, who is said to have "commanded several (sic) submarine boats while he was still a lieutenant," is very similar to the Drzewiecki apparatus. The lenses are, however, somewhat differently