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NEW YORK, SATURDAY, DECEMBER 28, 1901.

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.

TRANSOCEANIC WIRELESS TELEGRAPHY.

It appears to be pretty generally accepted that Marconi has succeeded in sending across the Atlantic audible signals from his wireless telegraphic station in Cornwall, England, to Signal Hill, Newfoundland—a distance of 1,800 miles. To be sure, the Newfoundland experiments have not been accepted by all scientists as conclusive, English physicists are particularly skeptical. Silvanus P. Thompson, although accepting Marconi's statements, leaves us to infer that success would not have been so easily attained if the letter "V" had been transmitted instead of "S." Prof. Dewar, if he has been correctly quoted, does not believe that the possibility of transmitting signals across the Atlantic has as yet been adequately demonstrated. On the other hand, Mr. Edison accepts the report as authentic, and Prof. Bell has cabled his congratulations and has offered his place on the coast of Nova Scotia as a place for future experiment.

During the International Yacht Races of 1899, held off Sandy Hook, it was the privilege of a representative of the SCIENTIFIC AMERICAN to interview Mr. Marconi, who, at that time, was superintending the sending of wireless reports of the races to The New York Herald. Marconi proved to be a man fully conscious of the possibilities of the new telegraphy with which his name has ever been linked, and yet exceedingly conservative in his opinions. In response to an inquiry from our representative on the future of wireless telegraphy as a competitor of the submarine cable, Marconi stated that he was content to work in the limited field then opened up to him by his invention; but, upon being pressed for an opinion, did not deny his belief in the possibility at some future time of being able to telegraph from one shore to the other. The impression of singular modesty then received has since been strengthened. In no authorized statement has Marconi hitherto exaggerated the results of his investigations. We are therefore inclined to accept his present announcement that he has succeeded in signaling from Europe to America.

If any proof were desired of the importance of the ocean transmission of that first wireless signal it would be found in the trepidation of the Anglo-American Cable Company and its hasty threat to stop all further experiments. It seems that this company has been granted a monopoly for fifty years—a term which expires in 1904—and that by the provisions of its grant it claims that Marconi can be enjoined from transmitting transatlantic messages.

It seems, in fact, that Marconi had acted hastily and probably prematurely in his determination to leave Newfoundland and seek a place of experiment on the mainland. It seems extremely doubtful whether the Anglo-American Cable Company could have enjoined him from continuing his experiments. Of course, very much depends upon the nature of the contract entered into between the company and the government of Newfoundland, but it is a well-accepted principle of the patent law that an inventor is entitled to make use of a patented device, provided it is for purposes of experiment only. Had Marconi perfected his system to such an extent as to place it upon a commercial basis, the conditions would have been far otherwise; but certainly for purposes of experiment it seems as if it would have been a difficult matter to have induced a court of equity to grant an injunction which would prevent his carrying on experiments which are being watched with such intense interest from the four corners of the earth. The Anglo-American Company does not claim to control any patents covering the mechanism employed by Mr. Marconi. So long as he does not land a cable on the coast of Newfoundland, it is a grave question whether it would be possible for them to prevent him from setting up an instrument in which the vibratory impulses are received through the medium of the air. We regret that Marconi did not, in the interests

of science, firmly maintain his position and resist to the utmost the selfish demands of the cable company.

APPRECIATION OF THE NAVAL NUMBER.

The warm reception which has been given to our special number describing the growth of the United States navy since the war with Spain, is another evidence that the deep interest in the United States navy which was awakened, or rather re-awakened, during our late war is but very little diminished. At the close of that struggle the fear was expressed that popular interest in naval affairs would pass away, and that the country would return to that attitude of indifference, which left the United States practically without a navy for two whole decades of her history. We are satisfied that the fear was unfounded, for the Editor's mail has brought, in the way of questions and criticisms on naval matters, and requests for more complete information, many more communications than we have found space to print. To us this is one among many indications that the people of the United States have realized how closely the prosperity and security of the country are related to the growth and efficiency of its navy.

It has been the aim of this journal to keep in such close touch with the Navy Department, and with the trend of ideas among the line and staff officers who construct and handle its warships, as to be able to do full justice to the best features of our naval work, without falling into the all-too-common error of using only superlative terms in speaking of the ships which are such an object of pride to all American citizens. In view of the fact that we have not hesitated to criticize where we thought criticism was due, we are particularly pleased with the many unsolicited letters of congratulation which we have received from high officials in the United States navy. Speaking of the Naval Number, the present Chief of one of the Naval Bureaus writes: "It is not only intensely interesting, but is beautifully prepared, and better than all, is correct," while a former Chief of the Bureau of Ordnance says: "You are doing a great work for the navy. No other paper approaches your literary work on the service."

BRIDGES VERSUS TUNNELS.

The decision of the Pennsylvania Railroad to connect its lines in New Jersey and Long Island with one another and with New York by tunnels rather than by bridges was natural, and, we had almost said, inevitable. There is to-day a growing tendency in all the great centers of population to place the means of transportation underground, and this for the very good reason that there is no further room for them above ground. In an earlier day it was customary to build rapid transit systems, and the approaches of trunk railroads in the great cities, on elevated structures; but the growing congestion of street traffic, vehicular and pedestrian, has brought us to a time when the piers and arches of steel or stone viaducts are no longer a permissible obstruction, to say nothing of objections on the score of the obtrusive ugliness of such structures. Hence we have been driven below ground, and the tunnel, thanks to electric lighting and traction, has proved to be a cleanly and comfortable substitute for the overhead structure.

To the engineer, and, indeed, to all of us who are attracted by engineering works of great daring and magnitude, it will be something of a disappointment that the proposed Hudson River bridge, with its vast 3,000-foot span and its towers reaching five hundred feet into the air, will not be built; but now that a great railroad company like the Pennsylvania has openly declared in favor of tunnels as the best method of serving New York with due regard to its own interest and the convenience of the city itself, we may take it for granted that the Hudson River bridge will never be built.

In justice to the proposed bridge, however, a word should be spoken in contradiction of the popular impression that a bridge would be a far more costly undertaking than tunnels. While it is true that the proposed two-tunnel scheme, shown elsewhere in this issue, will cost far less than the proposed Twenty-third Street bridge, we must remember that its capacity will be only one-sixth as great; for in designing his bridge Mr. Lindenthal proportioned it for the accommodation of no less than twelve separate railroad tracks, eight on the lower and, if required, four on the upper deck. Hence the proper basis of comparison would be that of twelve 18-foot tunnels against one bridge; and no doubt the bridge would work out in spite of greater real estate cost, as costing less than the twelve tunnels. The bridge, however, being exposed to the elements would be more expensive in maintenance. Moreover, unlike the tunnels, once the river was crossed a bridge would involve the erection of a vast viaduct and surface station that would seriously incumber our already overcrowded streets. The feature that will, more than any other, commend this tunnel scheme to our municipal authorities

and to the people of New York is that it will be absolutely unobtrusive.

ANNUAL REPORT OF THE WORK OF THE OBSERVATORY OF PARIS FOR 1900.

BY M. LOEWY, DIRECTOR. ABSTRACTED BY OUR PARIS CORRESPONDENT.

The past year has been an especially busy one for the Observatory, as it was necessary to make a proper showing at the exposition and to present a visible image of the work carried on and the progress obtained by the institution. Besides this, a number of events have occurred which have brought on new series of researches. The efforts of the director were especially engaged in organizing the International Astrophotographic Congress of 1900. This congress, owing to different circumstances, had an exceptional importance. It was necessary to assure the definite success of the map of the heavens, a work which has been in execution for twelve years, also to undertake one of the great problems of astronomy, the determination of the solar parallax, which it was hoped to solve with a precision unobtainable in the past owing to the discovery of the planet Eros, which comes so near the earth at certain epochs. The congress was held at the Observatory from the 19th to the 26th of July. In that short time, owing to the authority of the scientists who took part in it, the work has been most fruitful and important decisions were made, which will leave a durable trace in the history of astronomy. Concerning the photographic map of the heavens, the main object of discussion was the filling up of some of the gaps in the exploration of the heavens in certain regions of the southern hemisphere. Three of the observatories charged with the work of these zones had not been able to carry out the work. The efforts of the congress to better the situation have resulted favorably, and Mr. Thoma, Director of the Cordoba Observatory (Argentina), promised his aid on behalf of the government. Again Mr. Cooke, Director of the Perth Observatory (West Australia) is to take a share of the work, as the necessary subsidies have been obtained owing to the efforts of the congress. Lastly, M. Enrique Legrand is taking measures to have his government establish a special observatory at Montevideo (Uruguay) for this work. The importance of the map of the heavens seems to increase continually and it promises scientific results which have not been foreseen. Some late researches made by Mr. H. H. Turner, Director of the Oxford Observatory, prove that the map, which will contain millions of stars, will render results which we have scarcely ventured to hope for. Owing to a rectangular ruling which is superposed photographically upon the map, it is possible to take the positions of a multitude of stars with a precision comparable with the direct meridian observations. Photography thus enables us to accomplish a great work which would be almost impossible by direct observation, as it would take the united efforts of the astronomers of the world for hundreds of years before coming to an end.

To finish the task imposed upon it the Paris congress was obliged to establish an agreement concerning the determination of the solar parallax. This problem had been considerably discussed, and some eminent astronomers thought that the time had not yet come for its solution. It was under this difference of opinion that the congress deliberated as to whether a systematic observation of the planet Eros in different parts of the globe should be made to determine the parallax. The congress appointed a special commission of ten prominent astronomers to study the question, and it was decided to take up the work. As the observations had to be commenced at once, a series of tables and instructions was quickly prepared and sent out, so as to secure the co-operation of the observatories scattered over the globe and to render the publication of the results homogeneous and precise. As many as 58 observatories engaged themselves in the new enterprise, as follows: Abbadia, Algiers, Athens, Bamberg, Berlin, Besançon, Bordeaux, Cambridge (Eng.), Cambridge (U. S.), Cape of Good Hope, Catania, Kharkov, Charlottesville, Christiania, Copenhagen, Cordoba, Denver, Dublin, Düsseldorf, Edinburgh, Evanston, Flagstaff, Florence, Greenwich, Heidelberg, Helsingfors, Kasan, Königsberg, Leyden, Leipzig, Lisbon, Lyons, Madison, Marseilles, Minneapolis, Mt. Hamilton, New York, Nice, Northfield, Oxford, Padua, Palermo, Paris, Potsdam, Pulkovo, Rome, San Fernando, Strasburg, Tachkent, Tacubaya, Teramo, Toulouse, Uccle (Belgium), Upsala, Vienna (2 observatories), Washington, Williams Bay. The work only commenced in the first part of October, and from that time to the first of January, when complete details had been obtained from 20 observatories, it was found that in spite of the bad weather not a day had passed in which the planet was not observed by one or other of the prescribed methods. This numerous series of observations permits of obtaining the parallax with great precision, and these results will be more than doubled when the remaining work is finished. It may be remarked that this international project