

much construction work is under way, the mileage of track actually laid is but little greater than that for the preceding year.

The lowest point in twenty years in respect to railway building was reached in 1895, when only 1,803 miles of track were added, and 1897 has done a little better, the total now reported to us being 1,864 miles. California stands first with 210 miles laid on different roads, and no track was laid in New Hampshire, Rhode Island, Connecticut, Maryland, Kansas, Nebraska, New Mexico, Indian Territory, Arizona, Wyoming and Nevada, and five others barely escaped from this category. At the commencement of 1898 the United States will have 184,464 miles of completed railway.

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### ELECTRICAL PROGRESS.

On the threshold of the new year Mr. Tesla announces certain important advances in vacuum-tube lighting. He appears to have succeeded in increasing the intensity of the light obtainable from these tubes of highly rarefied gas, many hundred and even thousand times, and believes that he is still far from having attained the limit in the amount of light producible by this method. With this increase in intensity of the light, he claims to have effected, also, a notable increase in economic efficiency. While the details of the system have not yet been disclosed, the improvements realized are said to have been achieved by the gradual perfection of the means of producing, economically, harmonical electrical vibrations of extreme rapidity. In a communication on the subject which has just appeared in the *Electrical Review*, a photograph is shown, made on an exposure of two seconds, with the light of one of those tubes having an intensity of 1,000 candles. This picture is remarkable for the strong contrast of the lights and shadows, suggesting, in this respect, the well-known "flash-light" photograph. The bearing of these important advances on the subject of lighting in general is obvious.

The experiments of Lieutenant Squier and Dr. Crehore, who have made use of the alternating current and specially designed receiving and transmitting devices to utilize high speeds in telegraphing, have attracted much attention. The capabilities of their method have been put to test by Professor Preece, the Director of the Telegraphs of the British Government, and the results, which will shortly appear in the *Journal*, are highly encouraging.

The name of Marconi, an Italian experimenter, also figured conspicuously in the electrical journals in connection with the problem of telegraphing without the use of wires. It has been stated that by the method employed by this investigator he has succeeded in transmitting intelligence over a distance of eight miles without the use of wires. For this purpose Marconi utilizes the Herztian vibrations. His system has also been made the subject of special investigation by the British telegraphic service.

No radical changes in telephony were introduced last year, but numerous improvements affecting the efficiency and economy of the service have been introduced. There was also a considerable extension of the long-distance system.

The rapid growth of independent telephone lines during the past year is the most noteworthy incident in connection with the subject. The innovation has been confined principally to the smaller cities of the country, which have heretofore been without the advantages of the telephone, but it is rapidly

extending to the larger cities. The *Western Electrician* mentions among the larger municipalities that have been supplied with an independent telephone service, Detroit, Fort Wayne, Mobile, Sacramento, Cleveland, Baltimore, Newark, Richmond, Norfolk, and others. A large amount of capital is already invested in independent telephony; about 1,100 exchanges are in operation and in course of construction, and 20,000 miles of toll lines owned by the independent companies are completed, while many thousand miles of line are in process of construction.

The substitution of electric traction for steam traction on suburban lines has made steady progress during the year just passed, and, in connection with this phase of the subject, the experiments made by the New York, New Haven and Hartford Railroad on one of its branches, with the third-rail system, has been widely commented on, and generally with favor, as portending the gradual adoption of electric traction for certain forms of heavy suburban traffic. The announcement made within the past few days that the elevated railways of New York are to be equipped with this system as soon as the change can be made from steam to electricity, is another evidence of the tendency in this direction.

In electric power transmission there has been a decided advance during the past year, not only in the United States, but also in European countries. The Niagara plant has nearly doubled its former output, and the extension of its service to Buffalo is worthy of special mention.

The great extension of the introduction of the electric motor for miscellaneous uses, especially for the direct operation of machinery, is one of the most significant facts bearing on the future of this type of prime mover. For driving elevators, printing-presses, blowing and exhaust apparatus, machine tools, etc., and especially for transmitting power where the work is intermittent in character, the economy and convenience of the electric motor have gained for it general recognition. W.

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#### METAL AND MINERAL PRODUCTION OF THE UNITED STATES IN 1897.

The *Engineering and Mining Journal* places the total value of the mineral and metal production of the United States at over \$762,000,000. The values given in the *Journal's* statistical tables are of the products in their crudest forms—coal at the mine, coke from the ovens, pig iron from the furnace, etc. It is noted that the value of the annual product of the United States in 1897 exceeds that of any previous year; also, it greatly exceeds that of any other country, and nearly equals that of all Europe.

The *Journal* says: "The production of 1897 emphasizes not only the great total value, but also the immense variety of the mineral production of the United States. Not only is this country the largest producer of iron and steel, of copper, of lead, of silver and of gold, but almost every mineral and metal known to commerce is found within our borders, and is mined or prepared in some quantity."

We give from the same authority a few only of the more important items:

The production of gold in the United States in 1897 was 2,685,000 fine ounces, valued at \$55,498,950, an increase in value of about two and a quarter