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(Illustrated articles are marked with an asterisk.)

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EIGHTEEN HUNDRED AND EIGHTY.

With this issue the year's work of the SCIENTIFIC AMERICAN comes to an end. If anything signally memorable has happened or been done during the year, anything calculated to give 1880 especial prominence in the calendar of the second millennium of the Christian era, our point of view is too near to enable us to discern the fact or perceive the event in its true relations to the present and the future. At this moment the year seems to be an ordinary average year in every respect, a year signalized by no exceptional achievements in any sphere of human activity. Nevertheless it has been a highly satisfactory year, certainly to all Americans.

The promises of increased business prosperity and general industrial activity, so apparent at the beginning of the year, have been amply fulfilled. The crops have been good, in most respects above the average. Our mines and factories have been made to yield more than their customary products. Labor has been abundant and wages fairly good. Our internal commerce was never in a condition of greater activity; canals and railways have been crowded with freight, and the passenger traffic has equaled, if it has not surpassed, what is usual. The largely increased work of the Post Office Department and of the competing systems of electric telegraph bears abundant evidence of progressive commercial and industrial prosperity. The relatively few failures among business men furnish additional evidence of the satisfactory condition of our commercial and industrial affairs. Foreign trade has been active, and the steady flow of gold this way from Europe is proof enough that we have not been losers by the year's traffic. The steady decline in the amount of ocean freight carried in American bottoms is the one dark spot in the otherwise bright picture. The coming year should see a decided turn of the tide in this branch of national effort.

Of the purely scientific achievements of the year the most promising is probably the photophone of Messrs. Bell and Tainter, since it opens up a new line of investigation from which practical results of great utility can scarcely fail to flow. In other departments of scientific investigation there has been a reasonable measure of progress, but no signally important discoveries. A vast multitude of small advances have been made in a thousand different directions, advances whose significance may not yet be fully apparent; yet at this moment we fail to recall any that are likely ever to rank among era-making discoveries or achievements.

In the applications of electricity considerable progress has been made. The practical substitution of dynamo-electric machines for galvanic batteries in telegraphing is a decided step in the direction of economy. Recent improvements in harmonic telegraphy, and in devices for rapid telegraphing, promise to add materially to the usefulness and cheapness of electric communication. The development of telephone lines and telephonic exchanges has gone on with considerable rapidity. We fail to discover, however, any marked improvement in the character of the service. There seems also to be a decided lull in the work of improving the range and efficiency of the telephone itself. Has the limit been reached in this direction? It was reported a few weeks ago that the problem of telephoning through considerable lengths of submerged cable had been solved in England, but nothing seems to have come of it. Equally disappointing have been the promises so often made of the speedy connection of distant cities; that is, cities from one to two or three hundred miles apart, by means of the telephone. Quite a number of new telephones have been patented during the year, but as yet they have given no evidence of superiority.

Though not a product of the year, the electric railway has shown signs of real progress, and possibly great utility since the year began. The same may be said of the electric light. The use of lamps employing the voltaic arc has been steadily extended. In several American towns they have been successfully introduced for public lighting; and preparations are making for their speedy trial on a considerable scale in this city.

The incandescent lamp of Mr. Edison has been practically tested during a voyage around Cape Horn, on the steamer Columbia, and by continuous use at Menlo Park. The Maxim lamp is doing good service in the Equitable Building in this city, and good reports are received of the working of the Sawyer lamp in one or more public build-

ings in Philadelphia. Before the coming year is done with, we may expect to see one, perhaps several, forms of the incandescent lamp in pretty general use in the business part of our city.

Among the larger engineering operations and undertakings of the year mention may be made of the rapid progress of the railways which are pushing across the continent to make new connections between the Atlantic and the Pacific; the junctions of the two sections of the St. Gothard Tunnel; the revival of the Hudson River Tunnel project, and its prosecution in the face of difficulty and disaster; the completion of the preliminary work in connection with the proposed tunnel under the British Channel, and the beginning of what claims to be a serious attack upon the main work; the railway up Vesuvius; the rapid progress of the great East River Bridge; the successful transference of Cleopatra's Needle from Egypt to Central Park; the laying of several new and important Atlantic and other ocean cables: the final acceptance of the Panama route for the proposed ship canal, and the vigorous prosecution of that work (on paper) by De Lesseps; the theoretical development of Capt. Eads' plan of a ship railway at Tehuantepec.

In naval architecture we have the completion of the Czar of Russia's huge novelty the Livadia, and the launching of the Italian war ship Italia, the largest, most powerful, most heavily armed and armored floating fortress in the world. By contrast mention may be made here of the completion of the loftiest and one of the most beautiful and costly of temples of worship, the Cathedral at Cologne, after centuries of intermittent construction.

The dephosphorizing processes by means of which the immediate conversion of certain refractory iron ores into steel has been made possible, are not new; but not until within a few months have they proved to be practical and economical on a large scale.

The De Bay propeller is not new; but not until this year has it been tried on a vessel large enough to furnish an assured demonstration of its superior value and efficiency. In like manner the Perkins system of steam boilers belongs to a period earlier than the past twelvemonth; but it was left to the recent successful voyages of the Antracite across the Atlantic Ocean to illustrate if not to demonstrate the advantages of high-pressure steam for seagoing vessels. We recall no radical improvements made this year in machinery for the artificial production of ice; yet the scarcity of ice due to the unusual openness of last winter has given a remarkable impetus to the construction and use of such machinery.

It was our purpose to speak in this connection of the very creditable records made by American arts and industries in the international competitions at Sydney, Australia; at Berlin, in connection with fish and fisheries; at Cincinnati, in the Millers' Exhibition; at the exhibition of sheep and wool in Philadelphia; but there is no room for it here, and probably no need, for they are fresh in every mind. There is no room either, and possibly no occasion, for saying much about our work in the past or our intentions for the future. The steady annual progress which the SCIENTIFIC AMERICAN has made for nearly two score years is the best guarantee that no pains will be spared to make the paper more and more worthy of the large and increasing favor bestowed upon it by an intelligent and highly appreciative public.

ELECTRIC LIGHTS IN BROADWAY, NEW YORK.

Last year the New York Board of Aldermen passed a resolution requesting the Gas Commission to cause experiments to be made with electric lights, with a view to testing their adaptability for lighting streets, avenues, parks, and squares. No action was taken by the commission until recently, when permission was granted to the Brush Electric Light Company to test their system at their own expense on Broadway, from 14th to 34th street, a distance of a mile. The posts for the new lamps are now being set up, and it is promised that the lights will be in operation by Christmas. The iron lamp posts are twenty feet high from the base to the foot of the lamp. Their upper portions are supplied with projecting teeth, which are intended to be used as steps by the men assigned to keep the lamps in good condition. The lamps are constructed in accordance with the Brush patent, being from four to five feet in height and surmounted with an iron hood.

The whole number of lamps will be twenty-two; the wires will be carried from the top of one post to the top of the next for the present, or until the city decides to adopt the system, when they will be sunk under ground. Each lamp will, it is promised, give a two thousand candle power light, equal to about one hundred gas lamps.

The central station will be at No. 133 West 25th street, where the Corliss engines and boiler which operate the electric generators have been placed. About twenty-five horse power will be required for the twenty-two lamps, and one wire will convey the current to the entire series. It is promised that the light will be much cheaper than gas light of equal power. The success of the Brush system elsewhere reduces this experiment to a test of cost and the ability of the lamps to satisfy the requirements of the public eye.

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