

valued in 1851 at £2,697,891, were in 1855, £3,724,644. In 1853, 993 miles of railway were opened, and in June of the present year, 2,086, and the remuneration for labor has advanced in every year since 1849.

Spain has progressed rapidly during the last few years. Her population in 1854 was reported at 12,168,774; in 1857 it was 16,301,851. Its revenue in 1852 was £11,379,274; in 1857, it was £18,126,314. The total tonnage in 1850 was 244,854; in 1857, 349,762. Its imports and exports together were in 1851, £11,857,559; in 1857, £23,677,851. In 1855 the number of miles of railway opened was 130, in 1858, 456.

Switzerland has also progressed considerably within the last few years, though the statistics of that country are incomplete. Between 1853 and 1856 the increase in her chief imports was 12 per cent., and in 1857 still greater. The value of the exports of seven principal articles rose in those years from f. 246,019,148 to f. 373,246,817. The watch trade of Switzerland, however, suffered largely in 1857 from the revulsion.

Nearly every European state has given similar evidence of commercial progress during the last six or seven years, and of increase in population. —*Upper Canada Journal of Education.*

—Turning over the pages of the Cyclopaedia of Commerce, just published, a few matters attracted our attention as curiosities, which we propose to transcribe for our readers. We were looking for the small things in commerce—matters, that, in taking a magnificent, broad, and comprehensive view, would be overlooked—just as the invention of the greatest importance for domestic purposes would be overlooked and unnoticed in its homely attire when placed in exhibition and surrounded by works of polished art, costly machinery and gorgeous furniture. An humble inventor once placed in such an exhibition a few bunches of friction matches. They were unnoticed. Visitors went there looking for some great thing, not realizing that the despised package of splints, tipped with chemical fire, was the thing in that proud collection, destined to work a revolution in the means of procuring artificial light, and to become a universal necessity, to be deprived of which would be one of the greatest inconveniences that could happen.

It is not more than twenty years ago since the tinder-box was in universal use. It is abolished now. The invention of the friction match spread slowly; but who at this day would venture to say they could do without it? Insignificant as they appear to be, single factories, with expensive machinery, cut up large rafts of timber annually for matches.

Under the head of pins, we find that the manufacture of this indispensable little instrument was commenced in the United States, between 1812 and 1825, since which time the business has extended greatly, and several patents for the manufacture of pins have been taken out. The manufacture in England and other parts of Europe is conducted upon improvements made in the United States. Notwithstanding the extent of our own productions, the United States imported in 1856 pins to the value of \$40,255.

Still keeping our attention directed to small things, we find that the imports of needles into the U. S for 1856, amounted to \$346,000. It is said that needles were first made in England in the time of Queen Mary, by a negro from Spain; but he would not impart his secret; it was lost at his death, and not recovered again till 1568, in the reign of Queen Elizabeth, when a German taught the art to the English, who have since brought it to the greatest perfection. It is stated that the construction of a needle requires about 120 operations, but they are rapidly and uninterruptedly successive.—*Ibid.*

#### SCIENTIFIC INTELLIGENCE.

—The extraordinary brilliancy of the Aurora Borealis, as it appeared at different hours on Sunday night, the 28th of August, was such as has not been witnessed for years. About half past eight the beauty of its first appearance reached its height. A brilliant light first shone out from the North-west, then broad rays of equal splendor shot upwards from all parts of the horizon, arching over and meeting in a point directly overhead, forming as it were the frame work of a vast dome covering the surface of the earth. There then appeared, resting on this magnificent arch rose-coloured clouds gorgeously yet delicately tinted, such as are sometimes seen at sunset, and in places so dense as to shut out the stars behind them. The play of the light upon the rays of the Aurora, and especially at the crown of the arch, were extremely beautiful. Towards nine o'clock this gradually faded away, but more or less of the Aurora shone all through the night.—At midnight, again, it was particularly beautiful, the light being almost as bright as that of the moon when at its full, but the heavens were much more splendid from the effects of this curious phenomenon. A broad band of exquisite crimson shot out from the western horizon, reaching to the zenith, while the coruscations from every point of the firmament were magnificent in the extreme. The whole aspect was one of the utmost splendor, and one would hardly ever tire in gazing on the enchanting scene.

From all parts of North America we have glowing descriptions of the gorgeous appearance of the Aurora Borealis on the night of Sunday last. On Thursday night, the 1st Sept, towards 12 o'clock, the Aurora again appeared with extraordinary brilliancy and richness of coloring, giving a light almost equal to that of day.

The effect of the Aurora on the telegraph lines is thus stated by the Superintendent of the Montreal Telegraph Company, under date of the 29th of August he telegraphs as follows:—"I never in my experience of

15 years in the working of telegraph lines, witnessed any thing like the extraordinary effect of the Aurora Borealis between Quebec and *Pointe aux Pères* last night. The line was in most perfect order, and well skilled operators worked incessantly from 8 o'clock last evening till one o'clock this morning, to get over in even a tolerably intelligible form about 400 words of the steamer Indian's report for the associated press, and at the latter hour, so completely were the wires under the influence of the aurora, that it was found utterly impossible to communicate between the telegraph stations, and the line was closed for the night."

A telegraph from Boston, under date of September 2nd is as follows:—"There was another aurora last night, so that at about one o'clock ordinary print could be read by the light. The effect continued through this morning, considerably affecting and impeding the working of the telegraph lines. The aurora's currents from east to west were so regular that the operators on the eastern lines were able to hold communication and transmit messages over the line between this city and Portland, the usual batteries being disconnected from the wire. The effects were exhibited upon the Cape Cod and other lines."

The operators further say: "We have again experienced, this morning, a remarkable manifestation of magnetic influence on the wires running in all directions from this office, arising, doubtless, from a magnetic storm, which, were it night, would present a magnificent display of the Aurora. We observed the influence upon the lines at the time of commencing business—eight o'clock—and it continued so strong up to half-past nine as to prevent any business being done, except by throwing off the batteries at each end of the line, and working by the aurora current entirely! Several dispatches were in this way received from Portland, Maine, as well as on the line between South Braintree and Fall River, where they cut the batteries off, and worked for some time with the current from the magnetic storm. The waves were longer than I have ever seen them before, lasting sometimes over a minute; but the same peculiarities of changing the poles was observed. At about ten o'clock, a.m., the storm partially subsided, so as to enable the lines to resume the use of their batteries."

The *Boston Atlas*, alluding to the circumstance, adds, that "The wire was worked for about two hours without the usual batteries, on the auroral current, working better, as the operators state, than with the batteries connected. The current varied, increasing and decreasing alternately, but, by graduating the current adjuster, a sufficiently steady effect was produced to work the line with but little interruption."

Precisely the same thing was done on the Pittsburg Telegraph line. The *Pittsburg Chronicle*, after alluding to the appearance of the Aurora on Thursday night and Friday morning, says: "After getting the attention of Philadelphia, the battery at Pittsburg was reversed, and although the one at Philadelphia remained unchanged, and a heavy extraneous current pervaded the whole line, Philadelphia and Pittsburg were in full communication with each other, and by a way which, in the normal condition of the wires, and were there no foreign and unusual influences at work, would, of course, have been absolutely impossible. This telegraphic communication was practicable but for a few moments at a time, for this extraneous auroral current, being very capricious, and changing at frequent intervals, rendered the alteration in the poles of the battery necessary, to keep up the communication."

"Finally, in order to test the important fact just discovered still further and more conclusively, Pittsburg and Philadelphia cut off altogether the galvanic batteries, which are invariably and necessarily employed in the transmission of dispatches, and worked their instruments exclusively by means of the auroral electricity, which, while it continued, was exactly similar in its effects, though differing in kind, to that generated in telegraphic batteries—or what is known as the common atmospheric electricity. The flow of auroral electricity was steady and regular."

"A couple of messages were transmitted while the wires were under this extraordinary influence, and at intervals a lively chat was kept up by the same medium between the two operators at Philadelphia and Pittsburg, expressive of the novelty of this new method of overcoming, in a great measure, the embarrassing effects of the Aurora Borealis on telegraph wires."

"This, it is believed, is the first and only instance on record where the aurora itself—beautiful, glorious, and mysterious as it has always been considered in its brilliant manifestation,—has actually been employed to do the errands of man."

The extraordinary force of the agency has been commented on in communications from telegraph operators at various points. Mr. Toby, for example, the operator at Worcester, Mass, says:—

"The effect of the phenomena was most perceptible upon the telegraph lines. The wires seemed charged to their utmost capacity with the electric fluid, and seemed ready to flash forth with a fury that marks a vivid stroke of lightning. During ten years, experience in telegraphing I have frequently observed the effect of the Aurora Borealis on the wires, but never before have I seen it so grand and appalling."

One very remarkable circumstance connected with the auroral phenomena of last week, is their being seen simultaneously under almost precisely the same aspects, through so extensive a region of atmosphere, the phenomena visible at Quebec on the night of Sunday week being visible at the same hour at points so far south as New Orleans and Mobile. The display of aurora was also remarkable in England, as we learn by the