current is passing through the coil of wire surrounding it. Every one of the deflections read on the galvanometer as also the charge and discharge indicated by the magnetometer are carefully recorded, so that if a defect of continuity or insulation occurred it might be visible by comparison with those received before.

These are all the instruments in the electrical department, and this is a simplified explanation of their various uses, so that the unscientific can understand them.

## SLOWNESS OF THE PROCESS OF TRANSMITTING MESSAGES.

Mr. Field states that messages could be sent both ways on the Telegraph before he left Trinity Bay. Private intelligence corroborates this, but adds that the process is, as yet, exceedingly slow. The Queen's Message took an entire day for transmission. The President's probably took another. There is an appreciable time consumed in the passage of the signal across the ocean. Moreover, the signal itself is lengthened out. The difference between the signals received by an ordinary line and those of the ocean cable, is compared to the difference between a short, quick note on a whistle, and the same note prolonged, rising and falling on the swell of an organ. It begins feebly, grows stronger, and then dies gradually. Ordinary instruments are not adapted to this unexpected phenomenon. Hence it is said arises the delay.

The great question of the day is whether the Atlantic Telegraph can, after all, be rendered useful with the apparatus now at our can, after an, be rendered userill with the apparatus how at our command, or indeed with any apparatus. If it should turn out that, in the very nature of the case, dispatches cannot be transmitted with greater rapidity than fifteen words an hour, for example, a great disappointment will certainly be experienced on the part of the public as well as of the stockholders. On this head the experience of the theorem hines bid down in the Medicentre in mathematic of the telegraph lines laid down in the Mediterranean is worthy of consideration. These were the longest submarine lines in existence previous to the great success of Mr. Field and his associates. From Cagliari in Sardinia to Malta the line is six hundred kilometres, or about three hundred and seventy-five miles; and that from Malta to Corfu is of about the same length. Complaints having reached the Sardinian Government of great delay in the transmission of dispatches between Malta and Cagliari they published a statement upon the subject signed by the distinguished Signor Bonelli, who is charged with the inspection of telegraphs in the Ministry of the Interior. According to this eminent electrician, it is found to be impossible as yet, by any system of signs, to transmit more than two or three words in a minute. Thus a dispatch of Indian news containing five hundred and eighty words has required five hours to pass from Malta to Corfu. This being the case with a line of three hundred and seventy-five miles, how much more tardy must be the transmission of news over the line of twenty-one hundred miles beneath the Atlantic ?

We understand that the Company propose to give Professor Whitehouse ample time to test his system thoroughly, after which Professor Thompson will test his invention, which is quite different from that of Professor Whitehouse, and after him Professor Hughes of New York will have an opportunity to test the capabilities of his invention, which is, we understand, about to be introduced upon one of the lines between London and Liverpool.

## DESCRIPTION OF THE TELEGRAPH CABLE.

Through the courtesy of the Hon. P. J. O. Chauveau, Superintendent of Education for Lower Canada, we are enabled to insert an engraving of the cable, also a section of it. The following description gives a very accurate idea of it :—In appearance, it much resembles the wire ropes sometimes used for raising heavy weights, dumb waiters, etc. The "core," or conductor, which is the nerve of the whole affair, is composed of seven thin copper wires that are singly scarcely as thick as an ordinary brass pin. These seven wires are twisted like a cord, so as to add to their strength, and at the same time, and to enable them to stretch with the untwisting of the outside or protecting wires. This core is heavily coated with gutta percha, and the latter is wrapped with tarred yarn. Outside of this comes the protecting wires which give strength to the entire fabric, and protects the interior from damage. This covering is made of the best wire, twisted up into cords, and with eighteen cords, forming the outside envelope. The entire thickness of the cable is 11-16th of an inch in diameter. We are informed that the weight of the cable is 1,860 pounds to the mile.— The cable is strong enough to bear in water six miles of its own weight when suspended vertically. The strands of protecting wire are quite slender, but it is calculated that in corroding under water, they will unite chemically with the mud in which they will lie, and will thus form a concrete mass, which will not be liable to be damageed. The cost of the telegraph cable has been put down as follows:—

Price deep-sea wire per mile Price spun yarn and iron wire per mile Price outside tar per mile	\$200 265 20
Total per mile	\$485
For 2.500 miles	212,500
For 10 miles deep-sea cable, at \$1,450 per mile	14,500
For 25 miles shore ends, at \$1,250 per mile	31,250
Total cost	258,250

## THE USES OF THE TELEGRAPH.

No doubt every considerable colony of Great Britain will be connected with the mother country ere five years more shall have elapsed, so that the Minister for the Colonies, sitting in his office in Downing-street, may talk with the Governors of all the principal Colonies, successively and interchangeably, in the course of the same evening. Thus a rebellion or savage irruption at the Cape of Good Hope may be known to the British Cabinet within a few hours after its occurrence, and orders despatched instantly to Gibraltar, Calcutta, Bombay, and Sydney, to send a regiment from each to the scene of trouble, and the Minister may announce to Parliament next evening that the troops required have all actually embarked and are on their way. Though there are wider stretches of salt water than that which separates Ireland from Newfoundland, yet no other unbroken line of submerged wire of equal length with the trans-Atlantic cable is required to connect with London the British possessions in every quarter of the globe. Even Australia requires no single cable of equal length with this. India, China, and the Cape of Good Hope, can all be connected with the "fast anchored isle" by lines mainly traversing water of considerably less depth than that which covers the Atlantic plateau, and touching the land every three or four hundred miles if desired.

The New York *Tribune* instances a case in American history in which the telegraph would have been of great use :

On the 18th of June, 1812, the American Government declared war against Great Britain, under the inspiration of the younger and less experienced Republican politicians of that day, overruling the judgment of their older compatriots, who had endured and still remembered the trials and sufferings of our Revolutionary struggle. We had many causes of complaint against Great Britain ; but one of the most prominent and palpable was based on her Orders in Council, by which our trade with the Continent had been most outrageously harrassed and crippled. Those Orders in Council had been repealed before we had declared war, though the fact was unknown and unsuspected here. Had it been known—in other words, had the Atlantic Telegraph then existed—it is quite probable that war would not have been declared, that further negotiations would have been had, and an amicable redress of grievances attained, saving to dollars.

Another chapter in the history of the war 1812 affords an illustration equally striking. The battle of New Orleans was fought on the 8th of January, yet articles of Peace had been signed at Ghent on the 24th of December, fifteen days before. The news of this peace did not reach here till the 11th of February, 49 days after it had been signed by the Commissioners. If the oceanic and land telegraph had existed then, what a chain of events would have been broken.

The Transatlantic Telegraph will afford means by which the difference of longitude between observatories in this country and Europe can be determined with the same accuracy as latitude is determined, which is a matter of paramount importance both to the astronomer and navigator. It is consoling to the former, because the transportation of chronometers to Europe and back will be done away with, and the many thousand troublesome observations required for the determination of longitude will be abridged. Heretofore science has not afforded means by which the coast of the United States could be delineated on a chart, in comparative position with the coast of Europe, nearer than a mile. This is one of the many practical benefits which will be realized from the completion of this great work.

## CONCEPTION AND HISTORY OF AN INTERNATIONAL TELEGRAPH.

In 1851-2, a young man named F. N. Gisborne, then only recently from England, his native place, 'engaged in a telegraph office in Montreal. After availing himself of all the scientific results then evolved in regard to telegraphic communication, he conceived the feasibility of a transatlantic line. He proceeded to Halifax full of enthusiasm. Preliminary to the work, he must have a line from Halifax through New Brunswick to the United States. He met with ridicule, but succeeded in getting Howe and Young, leading