than the ordinary manipulations with the key. To accomplish this, strips of paper are perforated by machinery, in such a manner that the perforations may correspond to the signs representing the latter, figures or words, and by means of these perforations and the intervening spaces, or whole portions of the paper, the circuit is broken and closed with as great rapidity as a slight spring pressing upon the strip of paper can be made to act. It is only necessary that the motion of the paper at the other end of the line which is to receive the communication should move with a corresponding rapidity. In practice it has been found that the rapidity of execution is much less than it should be theoretically; but, nevertheless, it is far greater than with the electro-magnetic telegraph. With this, as with all the plans for telegraphs hitherto undertaken, a difficulty of some importance has been encountered, from the imperfect insulation of the wires, although great pains have been taken to render the insulation as complete as practicable, and several patents have already been taken out for telegraphic insulators. As the insulated supports for the wires have to sustain a considerable weight, they must be made of considerable strength; and, moreover, as they have been made the sportive targets of lawless boys, and objects of less wanton though more malicious mutilation by mischievous men, it has been found necessary to give a due share of attention to strength and safety in this respect, and in so doing some sacrifice of insulating properties have been thus far deemed necessary. A curious result follows from this want of insulation. If it be assumed that the air is impervious to galvanic electricity, all that can return to its source between two distant stations, without traveling the whole distance, must pass down each post on the line, and can only reach the post through the substance of the insulating material employed, or along its surface in case it should be moist. A greater amount of electricity will pass down those posts nearest the station when the battery is in operation, and at the extreme end of the line only a feeble portion will pass through the instruments. The consequence of this has been, that upon the conductors being moistened upon their surfaces, the instruments at the distant stations would work wrth unequal power, and occasion much embarrassment. This difficulty is in some measure remedied, by having batteries at each end of the line, or at every station, although the defective insulation still exists for each. I am inclined to think, however, that the air, when loaded with moisture, is a conductor of galvanic as well as of mechanical electricity, as indicated by my experiments, several years since, with the immense copper roof of the Patent Office, forming a great galvanic plate of upwards of 20,000 square feet of surface. If it is sufficiently so to be of practical value, it is obvious that entire insulation of telegraphic wires will be difficult to accomplish.

The crossing of rivers and large bodies of water, by means of submerged wires, does not seem yet to have been attained, and the chief obstacle thus far is imperfection in the methods of insulation. The plan which I proposed several years since appears to be worthy of trial. It consists in using a local circuit and battery of quantity at each river or body of water. The galvanic currents employed on the main routes are of small quantity and high intensity; hence a slight defect of insulation in a submerged wire would be productive of a great loss. But by using a current of quantity and the lowest possible intensity, to be set off by a local magnet, I am inclined to think that a single wire laid in the river with the most ordinary preparations for insulation, would be effectual in establishing connection between the terminations of the great line on opposite sides of the river or other body of water. It has long since been proposed to connect the eastern and western continents by means of telegraphic wires laid down in