discovered that a piece of iron, surrounded by a spiral wire through which a current of galvanism passed, would become magnetic. From this fact Ampère deduced the hypothesis that magnetism is the circulation of currents of electricity at right angles to the axis joining the two poles of the magnet. That was a brilliant deduction; but no practical result was produced from it until 1825, when the first simple electro-magnet was made by Sturgeon, who bent a piece of wire into the shape of a horseshoe, and wound a fine wire around it in a helix, through which the galvanic current passed; and he found that the horseshoe wire was magnetic as long as the current flowed. Then at once an attempt was made with Sturgeon's magnet to produce the electro-magnetic telegraph, but without success. The difficulty was that the magnetic power could not be transmitted from the battery for more than fifty feet with Sturgeon's magnet, which was, therefore, entirely useless for the purposes of a telegraph; and, in 1829, Professor Barlow published a scientific demonstration in England, which was accepted by the scientific world, that an electro-magnetic telegraph was impossible; which was true in the then state of knowledge.

In 1830, Professor Henry deduced from the hypothesis of Ampère the invention now known as the compound electro-magnet. He also answered the demonstration of Barlow, and proved that the electro-magnetic telegraph was possible. In the same year he set up an electro-magnetic telegraph in Albany, over a line of a mile and a half in length, using a polarized relay, the armature of which was pivoted so as to vibrate between its poles as the current of electricity was reversed, thus transmitting intelligence by sound.

In 1831, Professor Faraday made known his discovery of the phenomenon of magnetic induction.