

# The illusion of causality.

Wikipedia, 1 May 2012

[http://en.wikipedia.org/wiki/Hans\\_Christian\\_%C3%98rsted](http://en.wikipedia.org/wiki/Hans_Christian_%C3%98rsted)

Hans Christian Ørsted

On 21 April 1820, during a lecture, Ørsted noticed a [compass](#) needle deflected from magnetic north when an electric current from a battery was switched on and off, confirming a direct relationship between electricity and magnetism.<sup>[3]</sup> His initial interpretation was that magnetic effects radiate from all sides of a wire carrying an electric current, as do light and heat. Three months later he began more intensive investigations and soon thereafter published his findings, showing that an electric current produces a circular magnetic field as it flows through a wire.

[http://en.wikipedia.org/wiki/Michael\\_Faraday](http://en.wikipedia.org/wiki/Michael_Faraday)

Michael Faraday

Faraday's breakthrough came when he wrapped two insulated coils of wire around an iron<sup>[verification needed]</sup> ring, and found that, upon passing a current through one coil, a momentary current was induced in the other coil.<sup>[5]</sup> This phenomenon is now known as [mutual induction](#). The iron ring-coil apparatus is still on display at the Royal Institution. In subsequent experiments, he found that, if he moved a magnet through a loop of wire, an electric current flowed in that wire. The current also flowed if the loop was moved over a stationary magnet. His demonstrations established that a changing magnetic field produces an electric field; this relation was modelled mathematically by [James Clerk Maxwell](#) as [Faraday's law](#), which subsequently became one of the four [Maxwell equations](#), and which have in turn evolved into the generalization known today as [field theory](#). Faraday would later use the principles he had discovered to construct the electric [dynamo](#), the ancestor of modern power generators.

First let us deal with Ørsted.

The first thing we have to say is that the complete circuit is never drawn.

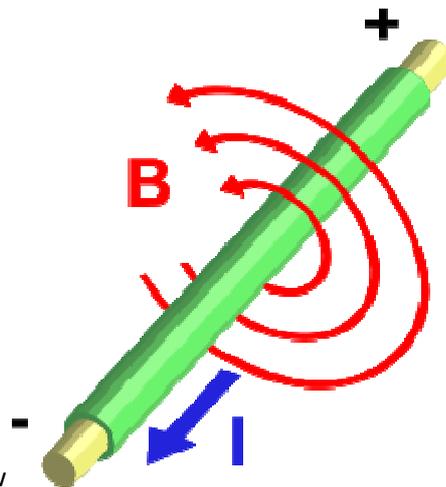
Take the case of a 100 volt battery connected to a 100 ohm resistor via a pair of conductors with characteristic impedance 100 ohms. On closure of the switches, a TEM step will begin to travel towards the resistor at the speed of light. This will entail an electric current of one amp. The ExH wave will contain electric field and magnetic field, which will fill the space between the conductors

up to the resistor. There will be no magnetic field beyond the resistor. Thus, the electric current in the resistor could be said to cause, or correlate with, magnetic field to the left of the resistor but none to the right of the resistor.

This contradicts Ampere's Law, where the magnetic field surrounds the 100 ohm resistor..

[http://en.wikipedia.org/wiki/Amp%C3%A8re's\\_circuital\\_law](http://en.wikipedia.org/wiki/Amp%C3%A8re's_circuital_law)

Ampère's circuital law



Ampère's circuital law



An electric current produces a magnetic field.

It relates magnetic fields to electric currents that produce them. Using Ampere's law, one can determine the magnetic field associated with a given current or current associated with a given magnetic

I would like to move on the Faraday, which is much easier for me to handle.

Faraday's experiment did not involve "passing a current through one coil", and this did not mean that "a momentary current was induced in the other coil". He introduced a TEM wave, involving both electric and magnetic field, into the first coil, and some of this leaked out into the other coil. At no point was there isolated electric current. At every point there was electromagnetic field, some of it leaking out into the second coil in the manner discussed in my 1967 paper <http://www.ivorcatt.co.uk/x0305.htm> . Faraday did not discover electromagnetic induction, which does not exist. He discovered crosstalk between one coil and the other.

The false interpretation of Ørsted's and Faraday's experiments led in due course to the false "Rolling Wave" theory of the TEM Wave <http://www.ivorcatt.com/2604.htm> .

Feynman, R., **The Feynman Lectures on Physics**, Vol I-III, (Commemorative Issue), Addison-Wesley Publishing Co., ISBN 0-201-5104-9 (Vol. II), (1989, 1964),

Feynman says "So, by a perpetual interplay- by the swishing back and forth from one field to the other- they must go on forever... They maintain themselves in a kind of dance- one making the other, the second making the first- propagating onward through space".

Albert Einstein and Leopold Infeld, 'The Evolution of Physics', pub. CUP 1938, p154; ' .... What kind of changes are now spreading in the case of an electromagnetic wave? Just the changes of an electromagnetic field! Every change of an electric field produces a magnetic field; every change of this magnetic field produces an electric field; every change of ....., and so on. As field represents energy, all these changes spreading out in space, with a definite velocity, produce a wave. The electric and magnetic lines of force always lie, as deduced from the theory, on planes perpendicular to the direction of propagation. The wave produced is, therefore, transverse.'"

<http://www.ivorcatt.co.uk/99mdwalt.htm>

Dr. David Walton discusses the correct model, "The Heaviside Signal".

Ivor Catt May 2012