

# ELECTROMAGNETISM

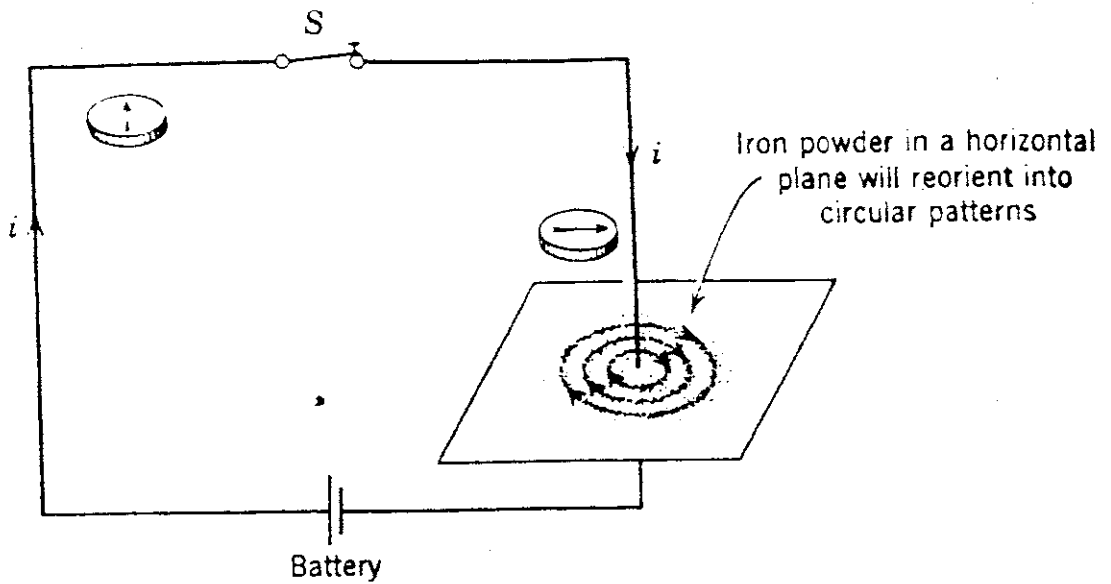


Figure 30-10 Magnetic field near a current-carrying wire. Arrows indicate the direction of the field

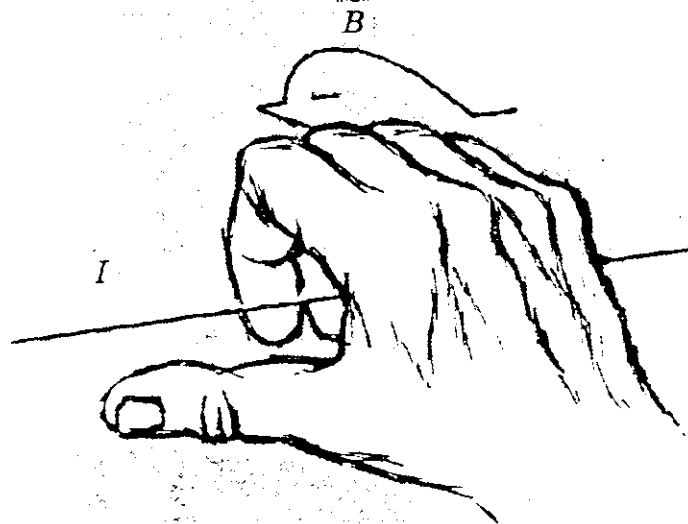


Figure 30-11 Right-hand rule—a method for determining the direction of the magnetic field caused by a current-carrying straight wire.

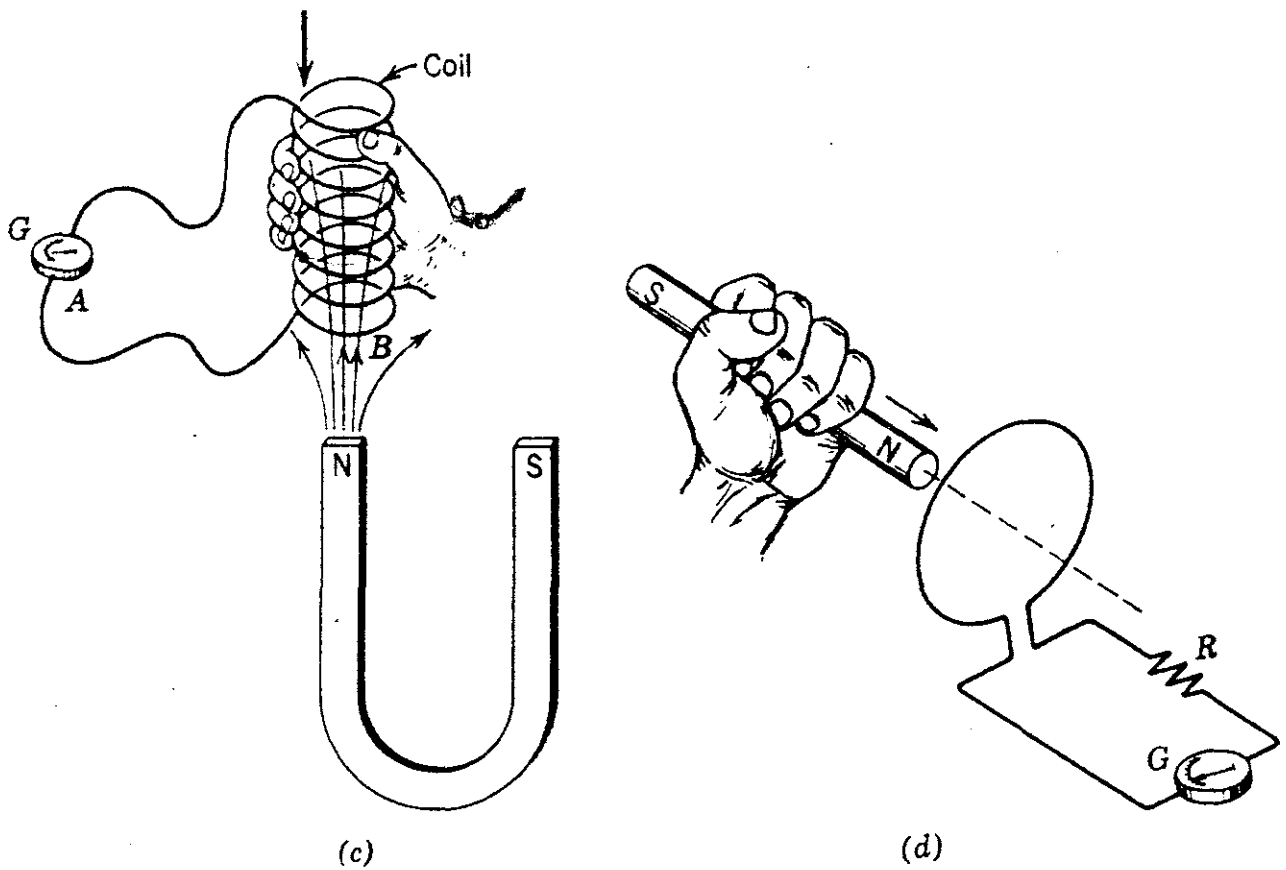


Figure 30-16 (a) (b) Induced e.m.f. The act of opening or closing the switch gives rise to a momentary change in flux through the coils. This causes a momentary induced e.m.f. in the coil connected to the galvanometer (a galvanometer is a current-sensing instrument). The induced voltage will give rise to an induced current. (c) The act of bringing the coil nearer to the North pole, or (d) bringing the North pole nearer the coil increases the flux through the coil. This gives rise to an induced voltage and current through the coil.

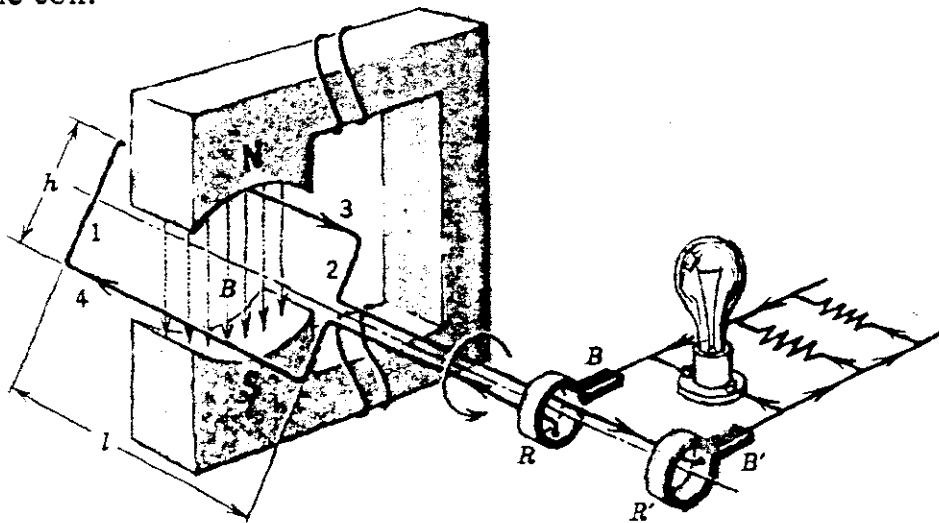
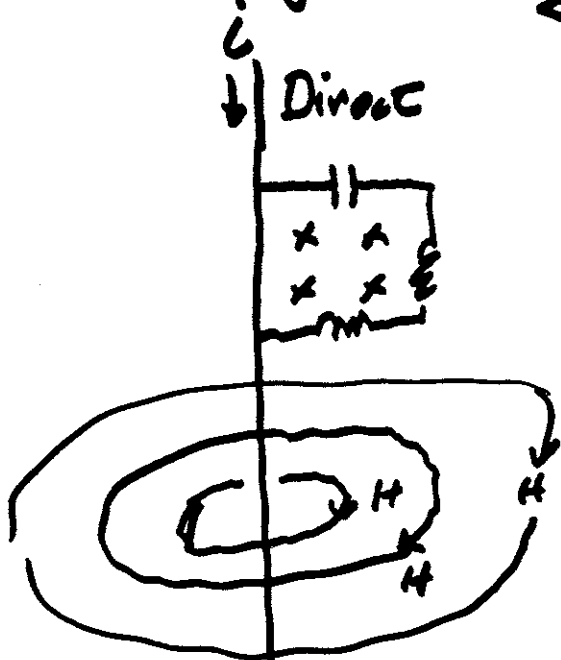
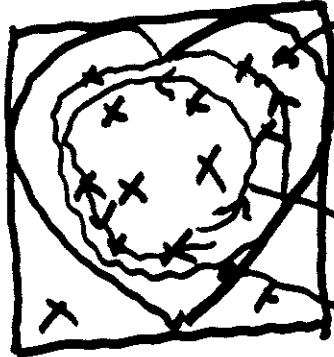


Figure 31-7 A.C. generator.

# Lightning - Field Effects



Circuit Board  
Human Heart  
etc



$$-\frac{dB}{dt}$$

( $B$  or  $B$ -dot)

$E$  - electric field

$i$  - induced current (density)

$$j = \sigma E$$

Ohm's Law

induced peak current / voltage ( $B$ -dot) max

## Insults

1. Arcing
2. Heating
3. Resonance



Indirect

Lightning Channel or

Down Conductor

$i, H, B$

