field strength B , as well as to the sine of the angle between the vector directions of I and B . The expression for the force is thus:

$$F = I \; l \; B \sin (I,B) \qquad (1)$$

The direction of the force F is perpendicular to the particle track (direction of motion of the electron current) a n d it is perpendicular to the field direction B of the magnet, so that it can be determined according to the "Left Hand Rule" using three fingers of the left hand to depict the three vector directions.

The "Left Hand Rule" :

Form a rectangular (cartesian) coordinate axes cross with the thumb, first finger and second finger of the left hand. If the thumb is then placed parallel to the direction of the electron current (flight direction of the electrons from the cathode (-) to the anode (+)) and the first finger is placed parallel to the direction of the magnetic field such that it points from the North pole to the South pole, then the second finger automatically points in the direction of the resulting force exerted on the electron beam, i.e. in the direction of deflection of this beam.
N.B. If the left hand rule is applied to closed current circuits in which a conventional current is taken to flow from the positive pole of the voltage source through the external circuit back to the negative pole, according to obsolescent conceptions, the resulting force vector F will be indicated with reversed sense.

If the magnet is made to approach the cathode ray tube with the North pole downwards (Fig. 4/I), the luminous spot will move from the center of the screen to the l e f t (0 to 1) as predicted by the left hand rule.
The d o w n w a r d directed arrow on the magnet indicates the direction of the magnetic field, which always runs from the North pole to the South pole. The direction of travel of the electron beam runs from the cathode (-) to the anode (+). Approach of the magnet thus produces a force which is directed to the l e f t in Case I.
The magnetic field direction runs from below to above if the magnet is turned round. This causes the cathode ray to be deflected to the r i g h t .

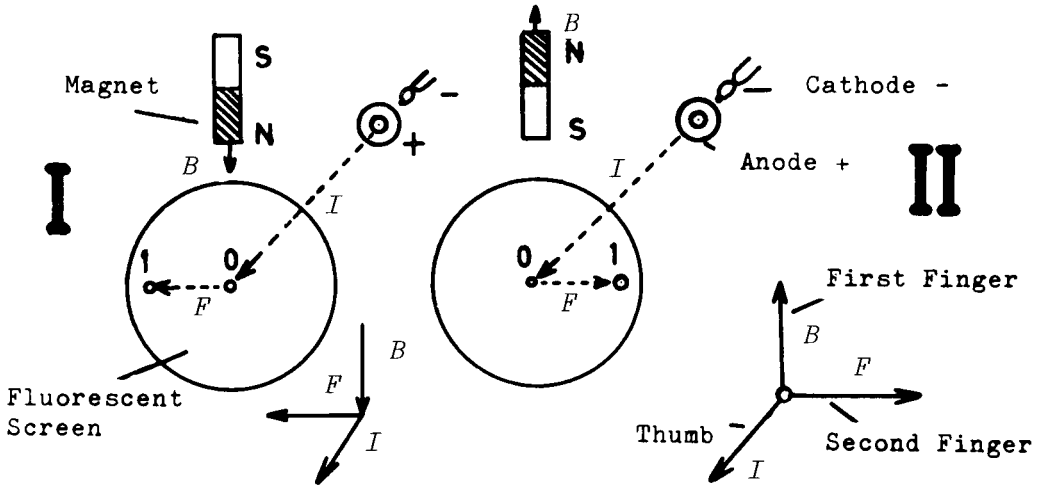

Fig. 4: Magnetic Deflection of the Cathode Ray