THE MAGNETIC FIELD

You have already seen in your laboratory experience that iron filings tend to cluster near the poles of a magnet. Magnetic effects can be observed not only at the poles of a magnet, but also for some distance away from the poles. The region around a magnet in which magnetic effects are observed is known as the **magnetic field.** This field is invisible, but its effect can be observed with the aid of iron filings. As you have seen, the field around the bar magnet is revealed by a pattern of lines extending from the north pole to the south pole (see Fig. 16-6). These lines, known as **lines of force,** form closed arcs around the magnet and never cross each other. The lines of force are most concentrated at the poles, indicating that the magnetic field is strongest at these points.

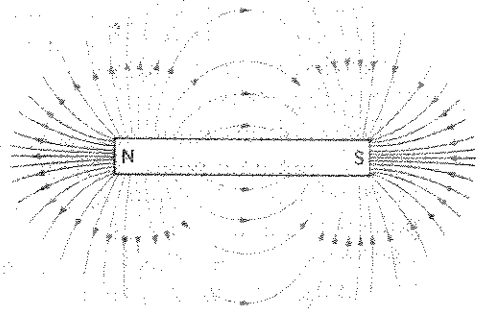
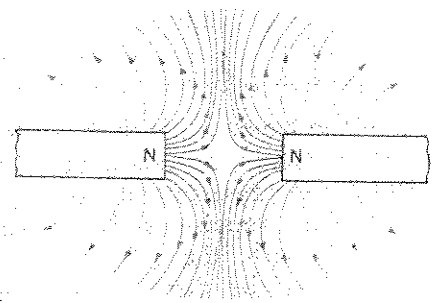


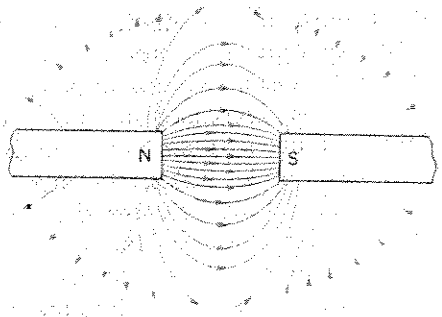
Fig. 16-6. Magnetic field around a bar magnet.



Pattern of iron filings showing the lines of force between two similar poles.

Fig. 16-7. Magnetic field between similar poles.

You also observed the patterns showing the magnetic field between the poles of two magnets. Between two similar poles, the lines of force appear to repel one another (Fig. 16-7). When the north pole of one bar magnet is placed near the south pole of another magnet, the lines of force indicate the attraction between these poles (Fig. 16-8).



Pattern of iron filings showing the lines of force between two dissimilar poles.

Fig. 16-8. Magnetic field between opposite poles.